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[OFFICIAL NOTICE.]

Fortieth Annual Meeting, New England Association of Gas Engineers.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS,
SECRETARY'S OFFICE, CENTRAL SQUARE,
EAST BOSTON, MASS., Feb. 4, 1910.

The 40th annual meeting of the New England Association of Gas Engineers will be held at Young's Hotel, Boston, Wednesday and Thursday, Feb. 16 and 17, 1910. The following papers have been prepared:

"Management of Water Gas Generators," by Mr. John F. Wing, Everett, Mass.

"Further Data on the Worcester Retort House," by Mr. D. D. Barnum, Worcester, Mass.

"Maintenance and Selling Methods of Gas Lamps," by A. R. Burr, New Haven, Conn.

"Some Single Unit Lighting Installations," by B. J. Bean, East Boston, Mass.

QUESTION BOX.

"How should gas ranges be treated to prevent rust and dingy appearance in daily use?"

Members having questions or topics which they wish discussed will please send them to the Secretary, before the meeting if possible. Those having names to propose for membership should send for application blanks.

The members will dine at 6:30 P.M., Wednesday, at Young's.

All friends of the Association are invited to attend the meeting, even though they may not receive a formal invitation.

N. W. GIFFORD, Secretary.

[OFFICIAL NOTICE.]

Annual Meeting, Illinois Gas Association.

ILLINOIS GAS ASSOCIATION,
OFFICE OF SECRETARY,
ELGIN, ILLS., Jan. 21, 1910.

To the Members, Illinois Gas Association: The next meeting of the Illinois Gas Association will be held at the La Salle Hotel, Chicago, Ills., March 15 and 16, 1910. A number of excellent papers have been prepared, and an enjoyable meeting is assured.

Yours truly, C. B. STROHN, Secretary.

[OFFICIAL NOTICE.]

Annual Meeting, Southern Gas Association.

SOUTHERN GAS ASSOCIATION,
OFFICE OF THE SECRETARY-TREASURER,
ROME, GA., Jan. 25, 1910.

To the Members of the Southern Gas Association: The Meeting of the Southern Gas Association will be held in Chattanooga, Tenn., during the 16th, 17th and 18th of February, 1910. Headquarters will be at the Hotel Patten. Hotel rates are quoted as follows:

Hotel Patten, European.—Room with bath from $2.50 per day. Room without bath, from $1.50 per day. For second person in room, from $1.50 to $2 per day additional.

Read House, European.—Room with bath from $1.50 per day. Room without bath, from $1 per day.

Hotel Northern, European.—Room with bath from $1.50 per day. Room without bath from $1 per day.

Negotiations are in progress with the South Eastern and the South Western Passenger Associations regarding railroad rates. These will be announced later by card. Respectfully,

JAMES FERRIER, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

WRINKLE DEPARTMENT, AMERICAN GAS INSTITUTE,
OFFICE OF EDITOR, ELECTRIC AND GAS BUILDING,
ATLANTA, GA., Jan. 10, 1910.

To the Members of the American Gas Institute: Please forward contributions for the Wrinkle Department to the above address. I would suggest that each manager address a letter of solicitation to the head of each department of his Company. Kindly assist me in this work I have undertaken, and greatly oblige, Very respectfully yours,

R. C. CONGDON, Editor.

LIBRARY OF CONGRESS, FEB 7 1910, SMITHSONIAN DEPOSIT.

[Special Official Notice.]

Bureau of Information, American Gas Institute.

Detroit City Gas Company,
Engineering Department,
Detroit, Mich., Nov. 26th, 1909.

To the Members, American Gas Institute: Send questions to be submitted to the Bureau of Information for answer to V. F. Dewey, Chairman, Gas Office Building, Detroit, Mich. The Bureau of Information respectfully solicits your troubles. Yours respectfully,

V. F. Dewey, Chairman.

BRIEFLY TOLD.

Public Service Commission, Second New York District, Considers Calorifics.—The Public Service Commission of this State, Second District thereof, held a conference on the 1st inst. with the gas companies of the State in relation to the question of establishing a calorific standard for gas. When the first notice of this conference was sent out, accompanied by the report of Mr. Hazzard, Chief of Division of Light, Heat and Power, the Empire State Gas and Electric Association appointed a committee to investigate the subject in preparation for the conference. The Committee held two meetings in New York, and, in the limited time available, studied very carefully the figures contained in Mr. Hazzard's report. The Committee met the Companies of the Association on Monday, January 26, in Albany, and reported its conclusions. At the conference all of the gentlemen who spoke urged that further time be allowed so that the question could be thoroughly investigated before any definite action was taken. Chairman Stevens suggested the appointment of a committee to lay out plans for and to conduct such an investigation as seemed desirable, and to confer with representatives of the Commission. He then turned the meeting over to the Companies to elect such a committee. Mr. M. J. Brayton, Vice-President of the Empire State Association, took the Chair and, on motion duly made, seconded and carried, the committee appointed by this Association was continued. After Chairman Stevens had again called the conference to order, Secretary Chapin, of the State Association, reported the appointment of the following Committee: Chairman, R. M. Searle, Vice-President, Rochester Railway and Light Company; and Messrs. W. R. Addicks, Westchester Lighting Company; T. R. Beal, Secretary and Manager, Poughkeepsie Light, Heat and Power Company; James C. DeLong, Vice-President, Syracuse Lighting Company; W. T. Morris, President, United Gas and Electric Company, and M. W. Offutt, Manager, Mohawk Gas Company. Chairman Stevens then asked the Committee to confer with Mr. Hazzard, Chief of Division of Light, Heat and Power, with Mr. C. H. Stone and Mr. H. H. Crowell, representing the Commission of the Second District. After the conference adjourned, the Committee met for a moment with the representatives of the Commission to set a date for their first meeting. At least one of the morning's papers had a short account of the conference, which account, however, was not absolutely correct. Secretary Chapin, therefore, forwarded the above statement of the situation to us - and for which we are greatly indebted to him. The Companies did *not* object to the recommendations contained in Mr. Hazzard's report, but merely stated that they did not know enough about the subject, at the present time, to feel justified in giving any opinion on it and they, therefore, asked for further time in which an exhaustive study of the subject could be made.

CURRENT MENTION.—

When the Geist combination succeeded to the control of the gas and water supply of Atlantic City, N. J., Mr. Frank R. Hutchinson resigned the post of Commercial Agent to the Atlantic City Gas and Water Company. The resignation became effective January 1st. Since then he has entered the service of the Lindsay Light Company, of Chicago, as its Special Gas Company Representative for the United States. This simple bit of information affords the opportunity of setting matters straight as to how the Geist combination and Mr. Hutchinson hold each other at the end of their business relations, which substantiation would not be here made were it not for a miserable report, fathered by a miserable person, trying to show that they had little regard for each other. The friend who furnished the news to us adds: "He left the Geist people in the cleanest sort of way - they're white clean through, as far as he could see, at least.

Mr. Frank D. Moses, President of the Gas Engineering Company, of Trenton, N. J., is under contract to construct a modern gas plant at Aransas Pass, Tex., as we understand it, certain capitalists, of whom that Prince of Gas Men, Mr. W. R. Tuttle, Manager of the San Antonio (Tex.) Gas and Electric Company, is one, are the proprietors.

[Communicated.]

The Graefe Calorimeter and its Critics.

By Dr. Albert Sohmer, Engineer Chemist, New York.

I have noted in your issue for January 24th the report of the Committee on Calorimetry, submitted to the American Gas Institute during the Detroit convention of that body. Regarding the description, or rather criticism, of the Graefe calorimeter, it strikes me that this report is far from doing justice to the instrument, and, furthermore, I consider that the arguments set forth in the same are not wholly correct.

Above all, it should be borne in mind that this instrument is by far the cheapest on the market, costing only $25. The writer is using it constantly and the results which we obtain are indeed excellent. It should be remembered that one of the greatest obstacles to the introduction of calorimetry is the great expense with the skill required in manipulation of other instruments; and that alone, for this reason, a cheap and simple instrument should be very carefully considered. It seems to me that the report on this instrument is far from doing so. You will note that the readings on the Graefe instrument should be corrected with a factor which is given as a constant with the instrument. The results published in Table No. 23, p. 153 (Series A. N.) are not corrected, and thus must create the impression in the mind of the reader that this instrument is totally unfit and unworthy of consideration. There is certainly no scientific reason why these corrected values are not given in a column directly under the uncorrected values. I note that, on page 150, the average of those values has been corrected; and why this was omitted on the actual results I cannot see.

I may furthermore state that I have been using this instrument for a number of years, and have never seen the flickering which occurred while those tests were made by the Committee, and which they state caused the inaccuracy of the results. I can positiv ely state that this can easily be avoided. To use 5 liters of gas with this instrument is also totally unwarranted, inasmuch as it is expressly stated in the description that the consumption of gas should depend on its heating value, and that for the average illuminati ng gas 2 liters, and no more, should be consumed. Thus it is apparent that what is stated on pape 150, about the amount of gas which has to be burned for each test being specified, is unnecessary, as this has alr eady been done. The reason given in your paper:

"* * * because the more gas that is burned the hotter the water in the calorimeter will become, and consequently the greater will be the radiation from the walls of the calorimeter, and greater will be the losses from products of combustion and entrained air,"

is also not new, for the originator of this instrument had that well in mind when putting it out, as expressly stated in his various descriptions, that which should be kept uniform in the various tests is the difference in temperature, not the amount of gas consumed, which latter is entirely dependent on the character of the gas. Lean gases, for instance, should consume more than rich ones, and only for this reason a 5-liter bottle is used, which would not be necessary if only rich gases were going to be examined.

I will be glad to submit you such tests and comparisons of this instrument which will clearly indicate that the greatest inaccuracy should be within 3 per cent. of the Junkers. Of course, when tests are performed no flickering should occur. An illuminant instead of a non-illuminant flame should be applied and the flame of the same kept constant during the test. It is easy enough to fulfil those conditions, which was not done during the tests of the Committee; and it is somewhat incomprehensible to me that such tests, in spite of the admitted inaccuracy, could have been published.

I think you will appreciate that accuracy, within 3 per cent., is good enough for a cheap, simple instrument, which is entirely independent of locality and can be manipulated at any time by almost anybody. I should think that a scientific body like the Committee on Calorimetry would have tried to emphasize the undeniable advantages of this instrument, instead of giving it a very prejudiced consideration, and I do not hope that this was caused by the fact that this instrument reads the net heating value and not the gross heating value, which latter, while undoubtedly being a theoretical figure and of no practical use, yet may be more palatable to some people.

A Few Practical Points About Water Heaters.

[Prepared by Mr. G. W. Savage, Chester, Pa., for the Meeting of the National Commercial Gas Association.]

My experience with circulating water heaters, such as are attached to kitchen boilers, proves to me that they are built with too small heating surface and too small burner capacity. I find that the consumer wants a heater through which he can get hot water in the quickest possible, time regardless of the efficiency of the heater. I have installed water heaters burning about 35 cubic feet per hour, giving an efficiency of 65 per cent., with gas of a calorific value of 650 B.T.U. per cubic foot, which would raise 50.7 gallons of water 35°, say from 65° to 100°. With these conditions it will require about 1 hour to get sufficient water for a bath, unless you have the large, flat-bottom bathtubs, which require about 50 gallons of water for a bath. I have been called on quite a number of complaints where they have large tubs and their complaint is that it takes too long to heat enough water for a bath, and I find it hard to benefit conditions. Many of the gas burners on heaters will not take care of more than about 38 or 40 feet. What we need is a heater that will take care of 70 or 80 cubic feet of gas. Even if the efficiency is as low as 55 per cent. we would find it a more satisfactory heater. Then, burning 80 cubic feet per hour, with gas at 650 B.T.U. per cubic foot, the heater would raise the temperature of 98 gallons of water 35°, or practically the same amount of water as the small heater in half the time with very little difference in cost. With a heater of this type, we would be able to overcome the difficulties where they have the large, flat-bottom tubs, and more than please the consumer with the small, old-style, round-bottom bathtubs. I remember in one case I was called on because of the water heater taking too long to heat sufficient water for a bath. I adjusted the heater to burn about 40 cubic feet per hour and heated the boiler (which was the 30-gallon size) from top to bottom. The water, when drawn in a bathtub, only filled it to the depth of 9 inches with a temperature of 105°. The same amount of water would have been sufficient for two baths in the old-style tub. Yet another difficulty which I find where circulating heaters are connected to boilers is rusty water. In the last few years quite a number of the old cast iron heaters have been removed and heaters with brass or copper water carrying parts installed to prevent rusty water. While the brass or copper heaters do not make rust, I find the same complaint after a short time. Even in winter, when the gas heater is not being used, the cast iron water-back in the coal range makes the rust and it is delivered to the faucet by the water by-passing around the boiler through the gas heater. My opinion is that this trouble will continue even with the brass and copper heaters unless we find some way to stop the rust from stirring up in the boiler and water by-passing though the heater to the faucet. I also find that as soon as the hot water faucet is opened the cold water rushes into the boiler through the cold water tnbe, which is not far from the bottom of the boiler, and stirs up rust, which is drawn through the heater connections.

I have tried out several different connections to prevent rust, and have taken the boilers down, washed them out, put in new circulating pipes and installed the Duplex boiler spud in the bottom of the boiler, taking the cold water supply for the heater from a point about 8 inches above the bottom of the boiler, only to find in a short time the same trouble over again. In one case, due to an old, rusty boiler, I had to take down a brass and copper heater and lose the consumption on that heater. I think I have since found something that will be of benefit in such cases. I took a boiler that was giving off very rusty water, and without taking the boiler down did away with the rust being delivered to the faucet by putting a cap on the end of the cold water tube and drilling a number of holes around the sides, preventing the water entering the boiler from rushing down against the bottom and stirring up the rust. I also put a duplex boiler spud in the top of the boiler, so that the hot water entered the boiler about 4 inches from the top. This breaks the drain through the heater when the faucet is opened and draws direct from the top of the boiler. Boilers should have the third connection on top, so as to connect the gas water heater independent of the hot water outlet from boiler.

Correspondence.

[The Journal is not responsible for the opinions expressed by correspondents.]

Not So Astonishing.[1]

Detroit, Mich., Jan. 27, 1910.

To the Editors, American Gas Light Journal: The writer read with interest an article by Mr. C. D. Lamson, of Worcester, Mass., entitled "A Pound of Coal," and also about the enormous yields obtained, which are attributed to the high and even heats. These results, if selected coal is used, the same way as tests are sometimes made with marine boilers, etc., are not astonishing. The results are obtained, not on account of the high heats, but, on the contrary, on account of the low heats; and they are simply an adaptation of the chamber retorts or chamber ovens. In other words, the retorts are filled to their maximum capacity and the coke pushed out, making practically a chamber retort out of an ordinary retort.

This process is nothing new whatever, for the writer did the same thing in Alba, Italy, in 1882, with ordinary retorts, and not with "throughs." The reason this construction was used was that coke of a greater density than generally obtains was required. To discharge the retort, instead of an ordinary rake a rake with a flat head was inserted into the bottom of the retort instead of the top, and the coke pulled out that way. The coke obtained then was hard and solid, and the production of gas was higher than generally obtained, but the charges wer longer, 8 hours or so.

The results said to be obtained at Worcester are not astonishing, if selected coal is used; 5.6 or 5.7 cubic feet are nothing extraordinary with chamber ovens or chamber retorts on 12-hour tests, respectively, 24-hour charges, with coal containing as high as 9 per cent. ash and 29 per cent. volatile matter.

Mr. Lamson advances the statement that the fireclay material has a high heat conductivity, and is, at the same time, of a very high fire resisting quality. Either one or the other of the statements is wrong. A pure silicon material would have a high conductiveness of heat and would have a high fire resistance, but the so-called "Ricon" material is no such thing. It is a material which has become known in America as a "Quartzite" material, and is likely nothing more nor less than a high grade fireclay material of the aluminum-silicon series, like that mined in St. Louis, to which a certain amount of silicon has been added. The adding of the latter depresses the melting point of the so obtained material considerably, and that is the reason that 7-hour charges instead of 4-hour were used.

Mr. Lamson's own statement that he went back to 7-hour charges, disproves the claim of high heats, as the term is generally used. Of course, if anyone calls a temperature of a No. 17 segar cone, high heats, then the writer has nothing to say about it, and the material used, will, in the long run, not withstand the heat of the 18-segar cone without dropping and shrinking. Its melting point lies at 32-segar cone when it commeuces to flux; in other words long before the high grade American silicon material. The whole installation as it stands, is nothing more nor less than an adaptation of the chamber retorts; which was advocated and put to test in Europe years ago. See, also, an article in American Gas Light Journal, Nov. 1st, 1909, page 1012. Here is the same idea, with the only difference that the retorts are 20 feet long and 21 inches by 15 inches in cross-section; and the time of carbonization is limited to 12 hours, which is more rational. The true chamber retorts were advocated in England years ago; with what results the writer does not know; but a true chamber retort should be narrow and high, like the following description.

The heats which are necessary to develop a high yield per pound of coal, instead of being high, are ridiculously low. With the chamber ovens or chamber retorts they run up to about 2,200° F. In the chamber itself or chamber retort, about 1,700 F. The highest obtained in the combustion chamber by Mr. Lamson was 2,500 F., so that his own statement would go to prove that the heats are not high; 3,000° is nothing extraordinary in the combustion chamber of benches of nines or sixes, and material that will only stand 2,700 is not to be considered high grade.

Mr. Lamson states in his paper that the temperature of the combustion chamber is 2,431 and the temperature of the retort 2,009; there is a drop of 422, and not, as Mr. Lamson states, of between 200° and 250°. In his table on temperatures of combustion chamber 2,431° is about the medium, but by no means the highest, In comparing this, and making due allowances and comparing the drop in temperatures in chamber ovens and ordinary retort settings, it will be found that the drop in temperature is as high with the high conductive material which Mr. Lamson uses as with lots of other material manufactured in America and in Europe.

Take into consideration that the thickness of the material in the chamber oven is 4 inches, where the thicknesses of the retorts are from 2½ inches to 3 inches at the maximum, the writer cannot understand where the great conductiveness of the material comes in.

The point comes to this. It is not the material at all but simply the operating; that is to say, heavy charges under low heats. If the heats were high, as claimed, which the statement itself disapproves, there would be an endless trouble with pitch in the hydraulic and stopped standpipes.

Truly yours, Alba.

1. To hand too late for classification under proper heading. To be taken in connection with heading, p. 253.

Something Startling in Method of Gas Making.

[Prepared for the JOURNAL, by MR. FREDERIC EGNER.]

While the Swiss are actively engaged in eliminating coal gas and oil as much as possible from the necessities of life, by utililizing the melting snow and ice of their vast mountains, and converting the immense water power thus produced into electric energy and its resultants, heat, light and power, "A citizen of the United States, residing at Troy, in the county of Rensselaer, State of New York," has invented something, through means of which gas works and coal carrying railroads are promised to be largely put out of commission. Dr. Oscar Wettstein, Editor of "Wasserkraft," a contemporary published in the interests of water power, recently estimated that "electricity generated by water power costs from .0015 cent to .01 cent per kilowatt hour at the station, while electric power, generated by steam from coal, costs from 2 cents to 2.4 cents per kilowatt hour at the station." "The Outlook" quotes Dr. R. de Diesbach, of Freiburg, as giving the following interesting figures on the cost of construction and operation of steam, gas, oil and water electric power, per horse power:

	Steam.	Gas.	Oil.	Water-Electric Power.	
Installation.	$657.00	$475.00	$465.00	$191.00,	and the cost per horse power hour.
Operation...	5.46	3.99	3.08	1.59	

Our fellow citizen from Rensselaer gives no figures as yet; but the startling economies which may be expected *if* the invention proves practicable, of which a few of your readers, including the writer, and perhaps the Editors of the JOURNAL, may have a few doubts, will be better understood through giving extracts from the specifications shown by U. S. Letters Patent, No. 947,608, January 25th, 1910. The inventor,s name is given as Anson G. Betts, the title of the patent being, "Method of Utilizing Buried Coal."

Quoting from said specifications we learn that: "This invention relates to a method of utilizing the coal measures and coal remaining in worked-out mines. Hitherto coal has been dug and brought to the surface for utilization at the expense of much sweat and loss of life.

"The object of my invention is to obviate these sacrifices, and also to provide for the utilization of coal seams too thin or too poor for commercial use by present methods." "*Other objects* (the italics are mine.—F. E.) will appear in the following description of my method." Then comes the usual data to explain the drawings forming a portion of the specifications, showing in section views of coal seams and pipes let into them from above, through which steam, air and gases may be blown. The inventor then proceeds to say: "It is well known that coal may be 'gasified;' that is, converted into combustible gases, by combustion with insufficient air for complete combustion; and, if the right proportion of steam or water be used with the air, the coal can be gasified without causing an excessively high temperature, either in the coal or in the escaping gases, and the gas may be made so that it contains as much as 80 per cent. of the total heat of the coal, all that it is then necessary to do being to mix it with the proper amount of air for complete combustion. Such gases afford a more valuable and convenient fuel than the coal from which they are produced, and are especially suitable for running gas engines. The great advantage of gas over coal lies in its easy transportation to where it is used, and it produces no ashes, besides all which an even heat can be maintained without attention. Hitherto these gases have been produced by mining coal and gasifying it in a producer. According to my invention I gasify the coal where it lies underground, and I will now describe methods for carrying out my invention." The writer of this article is now in doubt whether to proceed or not with further detail of said invention; but the last sentence quoted is sufficiently startling and "sort-of gives the whole snap" away.

The next best thing (?) ever proposed in the direction of coal economy was to pulverize the coal, mix it with plenty of water, and then pipe and pump it to wherever it might be wanted, thus circumventing the coal roads. This is not a joke. It was seriously proposed by an otherwise very successful New York business man, who soon after met an untimely and pitiful death, but some of whose advanced ideas are in successful operation, not only in New York city, but in many other large cities of the world to-day. But for that sad accident it was on the cards to erect a great gas works upon the Newark meadows and use the pumped coal as a means of producing cheap gas for manufacturing or domestic heating purposes, supplying the same to all nearby cities and towns. It was a grand scheme, and since its originator had both immense wealth and influence, it might have become more than a fine theory. The writer was promised the position of Chief Engineer of the plant, but he is yet somewhat doubtful that it really was a fortunate thing for him that it fell through, though he has since been hunting for a job.

But Mr. Anson G. Betts, with his invention, has the other "skinned to death," for he is not only going to circumvent the coal roads but the gas works as well. "Here is richness!" No longer any need for horizontal, inclined or even vertical retorts; no, not as much as a coke oven! All these things will be saved after the invention described in the patent mentioned once is put into successful operation. In one section of the specification the inventor makes the following statement:

"Two shafts, or a shaft and bore hole, may be provided to the coal seam, and an air passage through the seam provided, either by driving from one shaft to the other, or the bore hole is sunk to the workings, if such do not already exist. A fire is started at the bottom of one shaft and a supply of air pumped down and water or steam also supplied, when gas analogous to producer gas comes out of the other shaft, and can be used for running gas engines, smelting works, glass works, firing boilers, etc."

Readers of the JOURNAL who are financially interested in gas works now have a "sure tip" as to how they may secure themselves, and maybe "get in on the ground floor;" for while, so far as the author is informed, no stock company has as yet been organized to promote this remarkable invention, it is not impossible that such a thing be done, for there are other lambs than those periodically shorn on the various stock and produce exchanges.

Copies of the patent can be had by writing to the Commissioner of Patents, Washington, D. C., or from any solicitor of patents; but it is hoped that herewith sufficient has been shown to illustrate the old adage that "All fools are not dead, yet."

The Illuminated Clock.

By "R."

Of course the illuminated clock is by no means new, for illuminated clocks of that nature or type were in use in ancient times, or when the tallow dip was employed as an agency for providing light. However, the manner of the application of the illuminated clock has changed a great deal in the past few years, especially with the introduction of better methods of lighting. The illuminated clock is employed for several purposes at the present time, one grade of which includes the class of small clocks employed almost exclusively for people who desire to see the time of night when it is too dark to see the face of the clock. Often these clocks are employed by night-watchmen or by people who have to arise before dawn; by doctors, who are liable to be called out at night, and by night workers of various trades and professions. These all use the miniature type of illuminated clock for the purpose of seeing the time even when the apartment is in darkness.

Another class of illuminated clocks can be found at railway stations, and often on the church steeples, where the faces of the clocks are transparent, the light being furnished behind so as to show the defining figures and hands of the clock during the dark hours.

Still another class of illuminated clocks is coming into service. This class includes the illuminated face clocks of the jeweler, or in fact any merchant who utilizes the illuminated clock for advertising purposes.

The illuminated clock is a great convenience to the public and it may be taken for granted that advertisers, having discovered this, have, therefore, introduced illuminated clocks in public places where the advertising matter on the transparent face of the clock can be read by the persons who scan the dials to determine the time. The illuminated clock is often reconstructed direct from any common clock, by simply removing the solid or dark face of the ordinary style of clock to make room for the transparent sort. That transparency is usually best obtained with common plate glass if the clock face is more than 2 feet in diameter; if under 2 feet, ordinary window glass of usual thickness will do. There are forms of transparence which may be used with very good results, but the window or plate glasses are acceptable and easily painted upon. Some of the frosted effects put on the plate fronts are beautiful. Colored figures may be ascribed and illuminated with much attractiveness by the brilliancy of the light shining through. Fig. 1 illustrates a clock form set up

with the gas pipe connections for supporting the frame of the clock at the bottom and for conveying gas to the back of the plate. Sometimes a very powerful arc lamp is needed in order to properly illuminate a large clock front. Again, we have the small sizes of illuminated clocks in which a single gas jet, reduced to small proportions, will answer all purposes. Further, there are forms of transparent faces that require a scattering of little gas tips in order to yield the right effect.

The mode of setting up a clock on a single upright is shown in Fig. 2. The pedestal is furnished with a base or foot calculated to properly support the heavy frame of the clock. The frame extends upwards, as the drawing shows, and carries along its back the gas pipe for the burners behind the plate face. This form of stand is used when it is desirable to put a clock in position independent of the walls or stands of the building. A rubber tube may be employed to convey the gas volume from the nearest house or building main connection to the lamp or lamps in the clock frame. But in some instances the form of the clock is not supported on a frame. To the contrary, it is set directly into the wall or masonry of the building structure, as in Fig. 3. It is quite an attractive thing to see the archway of a rich man's house, or the entrance to a garage, or the passage to a hotel from the street, lighted up with a clock face that denotes or shows the time. The light thus furnished not only casts a glow over the traffic way, but gives the time. Since the introduction of concrete buildings arrangements have been made for casting frames in circular style, as in Fig. 4, so that at any later time the illuminated clock structure may be set in and sealed. Hence a bare wall of a building may be provided with a clock illuminated with a jet, that furnishes light for the room inside as well as light as far as the rays are cast through the transparent face of the clock to the exterior.

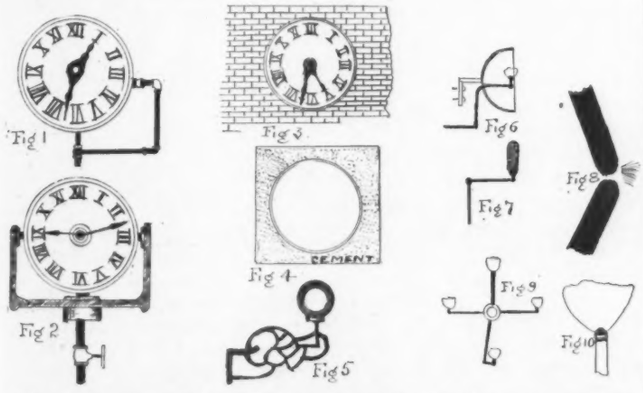

Fig. 5 shows a metal bracket arranged for fastening to a wall or post for supporting a small illuminated clock in the round piece at the terminus. The gas is conducted through the metal pipe forming a part of the bracket frame.

Forms of illuminants for transparent faces of clocks are next shown. Fig. 6 represents the ordinary style of single gas jet for the moderate sized clock; a reflector is furnished. Fig. 7 shows the mantle style of gas jet, and it can be used with good results. Fig. 8 shows the electrical arc, with the carbon tips adjusted at a good angle for casting the brilliancy of the light forward, or directly into the figures or lettered clock face.

Fig. 9 is a sketch of an arrangement often used for four or more gas jets, distributed at intervals about the space back of the transparency. Fig. 10 is the common house tip. The modern gas arc is also used with successful results.

[Continued from Page 200.]

REPORT OF PROCEEDINGS, FOURTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

Held in the Hall of Elks, Detroit, Mich., October 20, 21 and 22, 1909.

First Day—Afternoon Session.

The President, in inviting remarks on the paper by Dr. Hyde, said the paper by Mr. Macbeth followed right after the Doctor's paper, with a view that they might be discussed together. And that, if no objection was lodged, that order would be observed.

No objection being offered, Mr. Norman Macbeth (Philadelphia) read the following paper entitled

PRACTICAL APPLICATIONS OF ILLUMINATING ENGINEERING.

In one of the recent numbers of the technical press the statement is made "that electricity had gotten such a good start and prospered until to-day it is nip-and-tuck for business between gas and electricity * * * The lighting and small power business is going the electric way in bounds and that gas for lighting will be discredited everywhere, unless something is done to give the people something better for a less price."

The explanation is offered that the average gas man is lazy and a plea is made for contributions from gas men and their new business managers who, because of their success, cannot be included in the above indictment.

"We want a new era in gas lighting rather than a pushing of old methods. We need art glassware, well designed attractive fixtures, new lighting effects, new talking points, a little engineering, something from the decorator, a word from the oculist, substantial construction, convenient devices, and a system of maintenance that will keep the lamps always looking like new. Experts in lighting must be developed and there is no time like the present to begin."

Looking at the above statements broadly, we are forced to admit that they are true. From a somewhat inside knowledge of the situation, however, the writer is of the opinion that while undoubtedly the average gas man has not made the most of his opportunities, nor taken advantage of all the openings afforded him, he is not lazy, but badly handicapped for necessary information which would have a direct bearing on his sales. The situation is largely one of salesmanship. Salesmanship alone, however, would not go very far, unless backed with appliances and service, which are all that they should be, or at least as represented. Thorough maintenance is necessary, attractive and artistic glassware and fixtures desirable, and a proper treatment of the installation, from the standpoint of effective illumination, absolutely essential.

Regarding the "something better for a less price" statement, the writer is of the opinion that the "something better" is of vastly more importance than the lesser price. The best, however, is in the end always the least expensive. "Satisfactory service" carries and commands a high capitalization. Top notch maintenance at $1 is more acceptable to the consumer than poor, indifferent service at ¼ of that cost. A good lamp or mantle is better than a poor one, and is always worth the additional cost. Cheap, unsatisfactory mantles and equipment have done their full share to depreciate gas illumination. To the consumer, and to many gas men. mantles and lamps differ only in price.

A Standardizing Committee of this Association, acting with the manufacturers of gas lighting accessories, would seem to be a necessity. Mantles can then be required to meet specifications, which have been determined by thorough test to be satisfactory—standardized for size, color, cerium and thorium content, strength, weight and other points of importance. Mantles which show a depreciation of 10 per cent. in 1,000 hours are certainly entitled to a different classification than that kind which will show a drop of 10 per cent. in 250 hours, and as much as 30 per cent. or in lower grades, 60 per cent. in 1,000 hours.

Burners can be chosen with a view for the purposes and locations in which they will be used; their characteristics under various pressures and with different kinds of gas, can be investigated and the results published. A burner showing phenomenal results at one particular pressure on a laboratory test, may be a burner which would be of little practical value when used under the variable pressure conditions of the many towns and cities throughout this country. A tabulation from "Brown's (1908) Directory" gives, on 825 companies, as follows:

146 or 17.6	per cent.	reporting	between	1 and 2	inches	pressure.
521 or 63.0	"	"	"	2 and 3	"	"
158 or 19.2	"	"	"	3 and 6	"	"

It is not believed that these figures are accurate. They should, however, represent at least a shrewd guess or express the preference of the distribution engineers of the plants indexed. Low pressure in certain localities is a condition quite general; experience would tend to show that the maximum pressures are rather higher than shown by the above table.

Reference to the diagrams, Fig. 1, may give an idea of this effect of

pressure, which shows widely different results with different burners. Curves Nos. 1 to 5 are upright lamps, and Nos. 6 and 7 inverted. Nos. 1, 2, 3, 4 and 6 were plotted from results of tests on single burners, by L. W. Wild.[1] Nos. 5 and 7 are American lamps, upright and inverted, respectively, and show a marked difference in performance. The values in Nos 1 to 6 show the efficiency of duty of these burners in terms of horizontal candle power per cubic foot; those in No. 7 are in terms of mean spherical candle power per cubic foot of gas at pressures from 1.6 inches to 6 inches of water. This curve shows characteristics of extreme value; at all pressures beyond 2 inches it will be noted the efficiency shows a slight increase throughout. No. 6 shows the point of maximum efficiency at about 1.5 inches. For use exclusively in very low pressure, No. 6 ould undoubtedly be the better lamp; beyond 2 inches, however, this lamp would give very poor results. Curve No. 5, while not ideal by any means, is in marked contrast to Nos. 1 to 4. In the later tests the lamps were adjusted for maximum intensity at each .4 inch change in pressure. Lamp No. 3 show a duty at 1.3 inches, but 50 per cent. of that at 2.8 inches. In fact, any of the lamps represented by 1, 2, 3, 4 and 6 would show considerable differences in light output with changes in pressure The ideal lamp would be that in which the efficiency curve would be shown by a straight line.

If these curves of the lamps, investigated to 3-inch pressure only, are representative of average performance, the majority have little to recommend them to users requiring illumination, and would be expensive at any price above that commanded by their weight in scrap metal.

In the determination of factors for use in designing lighting installations, conditions similar to the above must be taken into account, and, until such times as authorities can succeed in a standardization of mantles and lamps, any factors given must necessarily be true for that particular manufacturer's product only, although in a general way they may be applied to other lamps having somewhat similar charateristics and efficiencies. The tables here given may for these reasons be somewhat restricted in their use. As they are typical, however, of an output of many thousand lamps, it was thought advisable to publish them in this manner with the qualifications as given above.

The factors given in Table No. 2 are taken from observations physical and illuminometer measurements, made on actual installations with average quality gas and with pressures of 2 and 3 inches, and represent results of investigations, which have been under way for over a year, both in the laboratory and on existing commercial installations. These installations were generally subject to maintenance service, and no attempt was made to secure the highest efficiencies, but rather representative working conditions, which could be readily duplicated. It might be well at this time to give concise definitions of three of the terms in general use by illuminating engineers.

The unit of light intensity is the candle power.
The unit of illumination the foot-candle.
And the unit of light flux or quantity – the lumen.

The unit of candle power is reproduced from specifications or by comparison with the standards maintained at the National Bureau of Standards at Washington, D. C. A mere statement of the candle power of a source does not mean anything unless qualified by a statement of direction, or mean candle power in a sphere or definite part of a sphere, nor should candle power be conceived to represent a quantity of light or associated, in any way, with distance.

The foot-candle is that illumination produced by a standard candle on a point surface at 1 foot distance, and it is this illumination which is effected by the distance from the source, the intensity of illumination varying inversely as the square of the distance. Thus, at 4 feet distance from a 16-candle power lamp, in the direction in which we get 16-candle power, the illumination would be 1 foot-candle, and 2 feet distant it would be 4 foot-candles, as the relative size of the surfaces, over which the same quantity of light is effective, are as 4 to 1.

The lumen is that quantity of flux of light which will produce a normal illumination of 1 foot-candle over a surface of 1 square foot.

A spherical candle produces 12.257 lumens.

TABLE No. I.

Class of Service.	Illumination in Foot-Candles.
1. Store rooms, warehouses, etc..	0.5 to 1.5
2. Residence and reading rooms..	1.0 to 3.0
3. General stores	1.0 to 3.0
4. Dry goods stores	4.0 to 7.0
5. Clothing stores	4.0 to 7.0
6. Detail work tables	5.0 to 15.0
7. Show windows	10.0 to 50.0

TABLE No. II.

Lighting Unit.	Nominal Consumption of Unit Cu. Ft.	Factors. Lumens per Cu. Ft. Gas per Hour Lighting Ceiling.—With Light Walls.	With Dark Walls.
Reflex lamps with frosted tip cylinders, Welsbach holophane or light (imported) opal concentrating reflectors	3½	125	114
Reflex lamps with frosted tip cylinders, Welsbach holophane or light (imported) opal distributing reflectors	3½	110	100
Reflex lamps with frosted tip cylinders, French roughed ball globe	3½	95	70
Reflex cluster lamp, 4-mantle, with alabaster globe	13	85	64
Inverted 5-mantle arc with alabaster globe	16.6	87	65
Upright 4-mantle arc with opal reflector and alabaster globe	20	75	55
Upright 4-mantle arc with alabaster globe only	20	66	48

Spacing Rules.—In large rooms, Reflex lamps with reflectors on single or multiple fixtures, should be suspended 7 to 17 feet above the plane, or approximately 9 to 18 feet above the floor, with the distances between outlets not exceeding 1½ times the height of the lamps (to mantle centers) *above the plane.* With roughed balls the distance should not exceed twice the height. In rooms with low ceilings, single lamp units may be required with proportionate distances apart, as given above. Inverted cluster and inverted arc lamps should be suspended not lower than 7 feet above the plane, and with the distances between outlets not exceeding two times the height *above the plane.*

Upright mantle arc lamps, not lower than 6 feet above the plane or 7 to 9 feet above the floor, with distances between outlets not exceeding three times the height *above the plane.* The "plane" is the surface assumed, ordinarily 2 feet 6 inches above the floor, on which the illumination is required.

In using these tables reference should be made (first) to Table No. 1, to determine the intensity of illumination desired, and (second) to Table No. 2, for the factor from which is secured the cubic feet of gas and number of units required to secure this intensity with the equipment selected.

Rule.—Cubic feet per hour equals area in square feet, multiplied by the foot-candles required (Table No. 1), and divided by the factor "lumens per cubic foot" (Table No. 2). The cubic feet of gas per hour divided by "the nominal consumption per light unit" gives the number of lamps or light units required. The above tables, supplemented by experience in placing lamps, will give results more satisfactory than can be secured through any method at all approaching this in directness, and with a minimum expenditure of effort.

The most satisfactory way to solve an illumination problem is to work from a plan of the room or area to be considered. This area may be divided into bays or sections of regular or irregular size, as may be necessary, and any special section can then be given an individual treatment, increased or reduced intensities, according to the character of the goods displayed or the purpose for which the illumination is desired. The proper placing of the units thus decided upon is largely a matter of experience and judgment.

The proper height at which to hang lamps and fixtures should be largely governed by the requirements of the room under consideration. Inverted mantle units especially should be placed as high as possible in order to take advantage of the favorable light distribution of this source, also to protect the eye against glare and the unsatisfactory effects so prevalent with upright mantle sources, which, because of their distribution characteristics, were suspended much too low for effective illumination.

In Fig. 2 is shown the similarity of light distribution from two upright mantle sources, on the right an upright mantle arc with opal reflector, and on the left an upright lamp with Q chimney. The distribution of the upright arc without reflector is quite similar to this curve on the left, the apparent candle power values of which were here changed 1 to 4, to enable the comparison to be more readily made. These lamps were usually hung quite low.

Fig. 3 shows a cross section elevation of a room 14 feet high and 14 feet wide with the "Plane of illumination" 2 feet above the floor. For a source suspended 6 feet above the plane (8 feet above the floor)

1. *Journal of Gas Lighting*, Vol. 48, 1907 p. 24.

the proportionate intensities are shown on the left for uniform normal illumination on the plane – walls and ceiling. On the right are shown corresponding values for a source 10 feet above the plane.

The intensity on the walls may and should be less than that in the central portion of the room. We desire only sufficient light to illuminate the wall fixtures or shelving, and this may properly be ¼ of the maximum on the plane. A brightly illuminated wall, through its effect on the eye, necessitates a higher intensity throughout the room where the light is required for close discernment of objects or goods, thereby reducing the efficiency of the installation as a whole. Therefore, assuming that a uniform intensity of illumination on the plane, walls and ceiling, is not desirable, the proportions were modified as shown by the marginal notations, Fig. 3, *i. e.*, 2 parts on the plane to ¼ on the ceiling and 1 one on the upper side walls.

The solid line curves, Fig. 4, show this relation. The dotted curve on the left is the distribution curve of an upright arc, that on the right, of an inverted mantle source equipped with prismatic reflectors. A comparison of these curves gives a fair idea of the distribution efficiencies of the two sources. The enormous amount of light in excess of that required, in the zone 30° above and 30° below the horizontal, which is dependent upon the low co efficient of reflection of walls, or shelving on which dark goods may be displayed, would insure only a small percentage of this light ever reaching the working plane, and accounts in a large measure for the increased efficiency of the more modern inverted lamp equipment over that of the upright.

It should be noted that by suspending the inverted mantle source higher than the upright, the intensities on the walls and ceiling will be sufficient and in proper proportion to that on the plane. Believing that an application of the rules and tables here given, to existing commercial installations, would result in a better understanding of their use, the following photographs and plans were prepared and will be analyzed in such a manner as it is hoped will bring out their good and bad points, and thereby serve as examples when making installations of a similar character.

In Fig. 5 is shown a millinery store, 79 feet 2 inches long by 14 feet 2 inches wide, with a ceiling 12 feet high. This store is lighted with 4 Reflex cluster lamps, installed on outlets approximately 20 feet apart. The ceiling and upper side wall being light buff, with the lower side walls a dark green, considering in addition the wall cases and dark mission oak furniture, this installation would be considered under the heading of light ceiling and dark walls.

Referring to Table No. 2, we find this type of equipment will deliver on the effective plane 64 lumens per cubic foot of gas per hour. The area being 1,121 square feet, the nominal consumption of gas on 4 outlets, 52 cubic feet per hour, the lumens per square foot, that is, the foot-candles effective per square foot, would be 52 times 64, divided by 1,121, equaling 2.96 foot-candles. This intensity, when judged by the eye, was found to be quite satisfactory. The installation could, of course, be slightly improved by raising the fixtures. These are at present at a height of 8 feet 8 inches from the floor, which is considerably less than half the distance between the outlets.

In Fig. 6 is shown a somewhat unique installation, inasmuch as the ceiling is rather lower than the average, being but 9 feet 1 inch high. The area of this room (17 feet 2 inches by 38 feet 6 inches) is 661 square feet; light green ceiling, buff walls, green carpet. Considering the width of this room and the general arrangement of the counter and tables, together with the light ceiling and walls, the illumination can be handled very satisfactorily from the central outlets, using the fixtures as shown in the photograph.

The distribution of this particular lamp is shown in Fig. 7. This distribution, as may be noted, is quite wide, and with the lamps placed close to the ceiling gives a very satisfactory effect. The lamps on the two fixtures on the beams are quite close to the beam, the ports being but 9 inches below. It might be mentioned in passing, that while this installation has been in use practically 1 year, on the Boardwalk at Atlantic City, the air is clean and free from dust, and as a consequence, there has been no discoloration on the ceiling.

Referring again to the Table No. 2, under Reflex lamps with French roughed ball globe, we get a factor at 95 lumens per cubic foot of gas per hour. This factor, times the total consumption for the 9 lamps (30 cubic feet of gas per hour) divided by the area, 661 square feet, shows an effective illumination of 4.3 foot candles. This would come under the head of brilliant illumination, and as this particular floor is used more as an advertising and display room, the resultant illumination is all that could be desired.

In Fig. 8 is shown another installation quite similar to Fig. 7; that is, so far as the purposes for which this store is used, and the type of light unit installed. This store is 18 feet 8 inches by 45 feet, with the ceiling 12 feet 6 inches high. The width between cases is 11 feet 8 inches, the cases being 7 feet 3 inches high, finished in white enamel paint. The ceiling and upper sidewalls are buff.

The outlets on this floor are placed approximately 9 feet apart, and for this type of distribution and outlet spacing, the fixtures are at about the right height, being approximately 8 feet from the floor to the center of mantles. The cases being separately lighted, the effective area to be considered for the general illumination would be that between the cases, approximately 525 square feet.

With five 4-light fixtures, having a consumption of 13 cubic feet each, or a total consumption of 65 cubic feet per hour, we would have 65 times 95, divided by 525, or 11.76 foot-candles. This, as may be noted, is extremely high, and has been amply proven by experience to be twice the amount either necessary or desirable, the manager of this store stating that he did not at any time use more than two lamps to the fixture, finding that quite sufficient to result in very brilliant results being secured.

Considering Fig. 8 as an installation problem, with a length of 45 feet and a width between cases of 11 feet 8 inches, very good results could have been secured by using 3 outlets only, these outlets being spaced 7½ feet from each end and 15 feet between the end and center outlets.

Using the same lamp equipment with a factor of 95 lumens per cubic foot, assuming an intensity of 5-foot candles, 525 square feet multiplied by 5 (foot-candles intensity desired) equals total lumens, 2,625. Total lumens divided by 95 (factor, lumens per cubic foot) equals cubic feet of gas per hour; and this, divided by 3½, gives 8.3 lamps, or in round numbers 9 lamps. Having before decided upon 3 outlets, this fixes the arrangement at 3 lamps per outlet. The changed distance to 15 feet would warrant a change in height of lamps to 7½ feet above the plane or 10 feet above the floor. It is evident that the installation here shown exceeded that required for a very brilliant effect by approximately 67 per cent. It is on installations similar to Fig. 8 that electric salesmen find little difficulty in meeting gas competition.

In Fig. No. 9A is shown the plan of a men's furnishing store. This store is 89 feet deep by 14 feet 6 inches wide, with a ceiling 15 feet 9½ inches high. The decorations would generally be classed as light. Wall cases 7 feet 11 inches high by 2 feet deep reduce the effective area to approximately 1,290 square feet. There are installed six 3-light fixtures with inverted lamps and Welsbach holophane distributing reflectors, suspended at a height of 9 feet 8 inches from the floor to the center of mantles, at outlets approximately 15 feet apart. The total consumption is 60 cubic feet of gas per hour, or .0597 cubic foot of gas per effective square foot of floor surface, not including the wall cases.

Referring to Table No. 2, under the heading of this equipment, with light ceiling and light walls, we have a full factor of 110 lumens per cubic foot of gas. The product of the lumens per cubic foot factor and the cubic feet of gas per square foot, .0597, give an average intensity in foot candles of 6.57. This is a brilliant illumination, but not more than is required for the class of goods handled in this kind of store, which in Table 1 is given as from 4 to 7-foot candles.

The first and second outlets from the front should have been moved back 1 foot 6 inches and 2 feet 6 inches respectively, toward the rear, and all lamps placed 1 foot higher. This would have resulted in a more uniform spacing and consequently slightly increased uniformity of the illumination. It may be noted that the distance between outlets is about twice the height of the lamps above the plane. With this type of reflector for uniform illumination the proper ratio has been exceeded.

Fig. 10 shows the light distribution of the single lamp used on these fixtures. In point-to-point calculations for group or cluster fixtures it has been found quite satisfactory to multiply the values for a single unit by the number of units used. This may be done either by increasing the candle power values or calculating the illumination from 1 unit and increasing these intensities in the ratio of the number of units used.

Figs. 9-B and 11 show an installation quite different in character to those previously analyzed. The floor has a depth of approximately 103 feet with a width of 25 feet. The ceiling in the front part is 12 feet 1 inch high, with the rear section (approximately 46 feet deep) having a ceiling height 1 foot less, or 11 feet 1 inch. The ceiling is a light, "satin-like" finished paper, and the walls are yellow. The height of the fixtures in front is 9 feet 6 inches to center of mantles,

and in the rear, 8 feet 6 inches, the fixtures in each case being the same distance from the ceiling. Welsbach holophane distributing units are employed.

On reference to the plan, it would appear that some arrangement, other than that with outlets down the center, would have been more desirable. Conclusions based on the general appearance, however, supplemented with illuminometer measurements at the table height in various parts of the dining room, are to the effect that the present arrangement is quite satisfactory. In fact, the results are much better than if 2 lines of outlets had been carried down the ceiling, equally spaced 6 feet from the side walls and 13 feet apart. On the side tables the illumination measured 1½ foot candles; the tables next to the aisle and close to the fixtures ran as high as 4 foot candles. This variation is not objectionable, nor in fact such as would be noticed by the eye, as the minimum was practically 1½ foot candles; that is to say, as long as the minimum is not low, the maximum may be 5 times that amount without criticism; the higher intensity is noted as an addition to the brilliancy of the illumination.

On investigation, we find the area is 2,575 square feet, with seven 4 light fixtures installed, taking 93 cubic feet of gas per hour. The total lumens are, therefore, 93 times 110 (see Table No. 2), and the average illumination would be the total lumens, 10,230, divided by 2,575, or 3.98 foot candles. It will be noted that these fixtures were not equally distributed throughout, the front having a greater proportion than the rear. The latter section is used more as a passageway to the kitchen and was not considered as important as the two counters and the entrance.

In the carpet and rug store shown by plan Fig. 12-A, we have a length on the main floor of 95 feet 10 inches, with a width of 19 feet 1 inch, a gross area of 1,828 square feet. The ceiling height is 12 feet 7 inches, the finish white, with walls practically covered with shelving, showing dark carpets. An effective width between shelving of 15 feet makes the effective area 1,437 square feet, with five 4 light fixtures equipped with inverted mantle lamps, with prismatic reflectors, having a total consumption of 52 cubic feet of gas per hour.

Referring to Table No. 2, we find for this equipment a factor of 100 lumens per cubic feet of gas per hour; 52 times 100 gives 5,200 total lumens. This, divided by the effective area, 1,437 square feet, gives 3.62 foot candles. This is rather low for a store of this character. In Table No. 1 we find it should be 4 to 7, and on again referring to the plan, we find that the distance between outlets (26 feet) is too great (the height to center of mantles being but 9 feet 3 inches) and could be corrected by changing the position of outlets Nos. 2 and 3, moving each to the heavy crosses shown on plan, and installing another 4-light fixture at the central heavy cross and shortening all fixtures 1 foot. This would require five 4 light fixtures, having a consumption of 65 cubic feet per hour, and using the same factor, we have 6,500 lumens effective, which divided by the area, 1,437 square feet, results in 4.53 foot candles. In addition to the increased illumination, the uniformity would be much improved, and considering the purposes of display on this floor, the question of uniformity is an important one. The plane of illumination in this distance is on the floor where carpets are displayed.

The rug room in the rear is 51 feet by 13 feet 10 inches, but with an effective length of only 46 feet, due to rolls of oilcloth and matting being stacked up in both ends of the room. The effective area is, therefore, 636 square feet, and three 2-light fixtures are installed, using the same equipment as that on the main floor, with a consump-

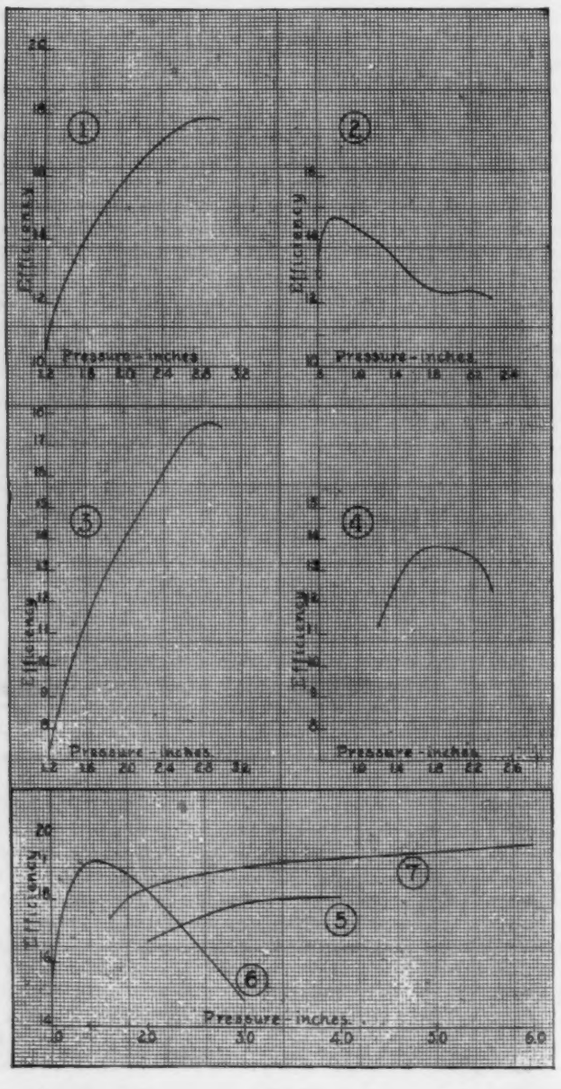

Fig. 1.

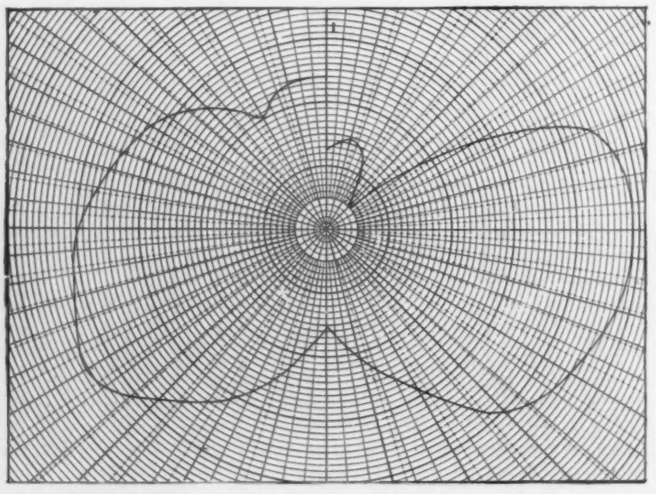

Fig. 2.

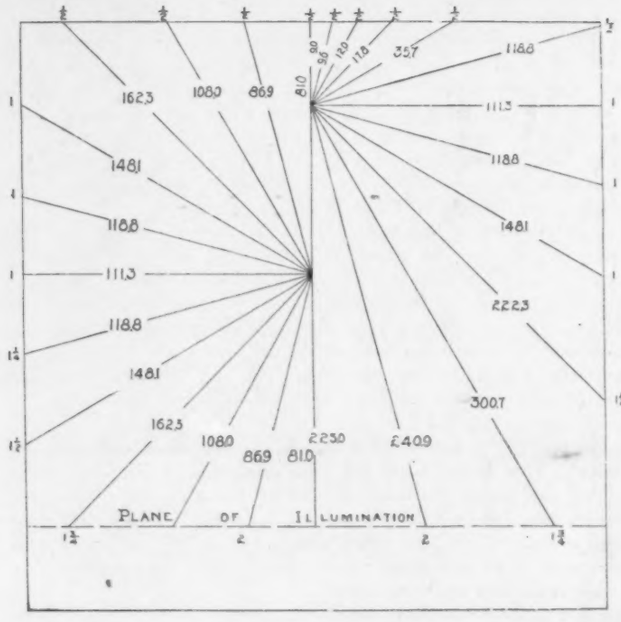

Fig. 3.

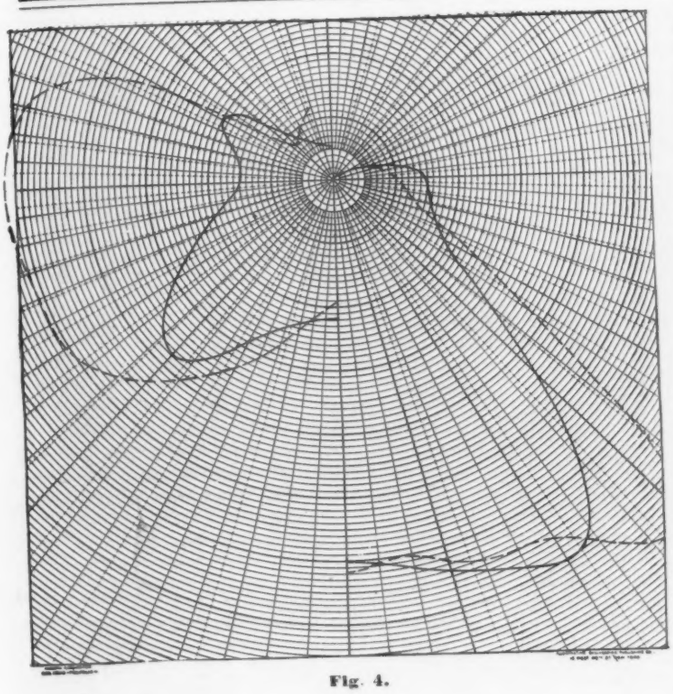

Fig. 4.

Fig. 5.

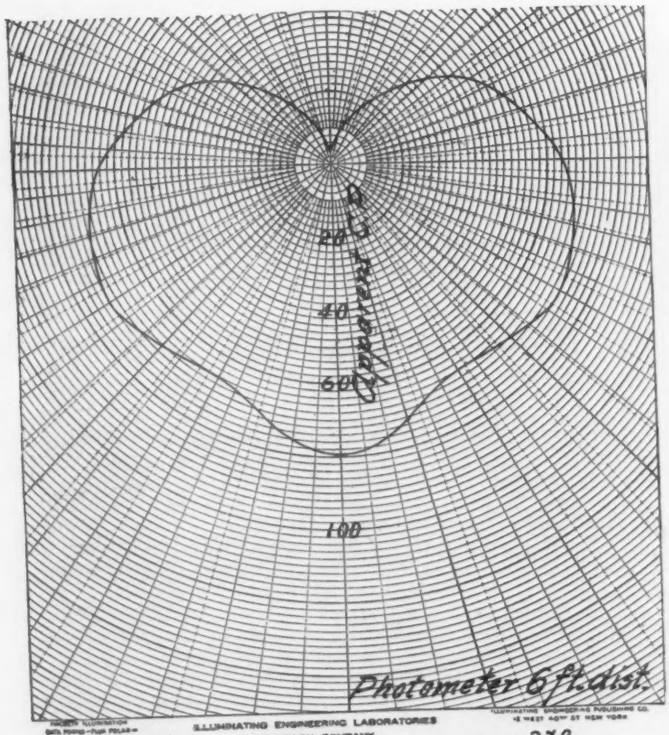

Fig. 7.

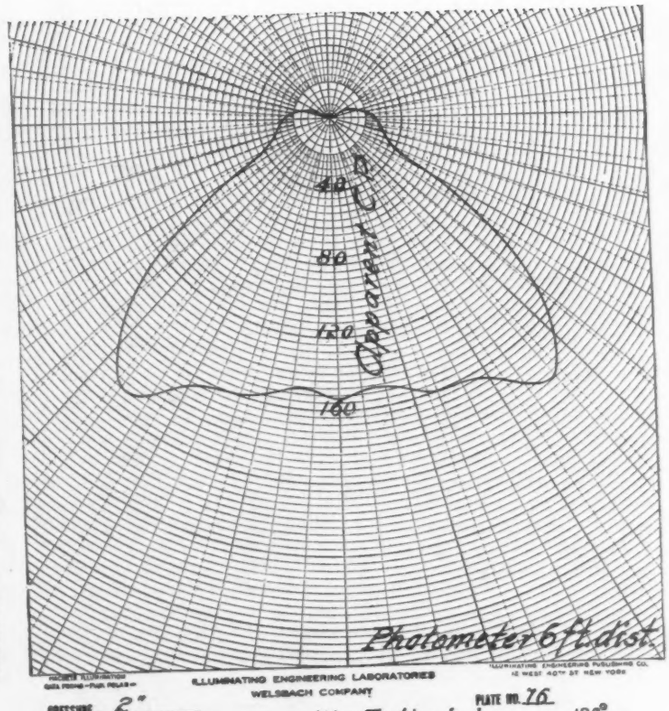

Fig. 10.

Fig. 6.

Fig. 8.

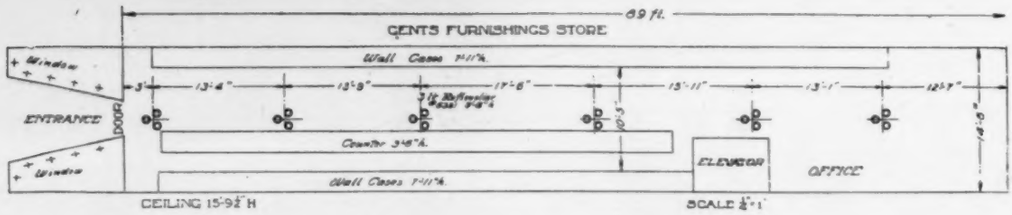

Fig. 9-A.

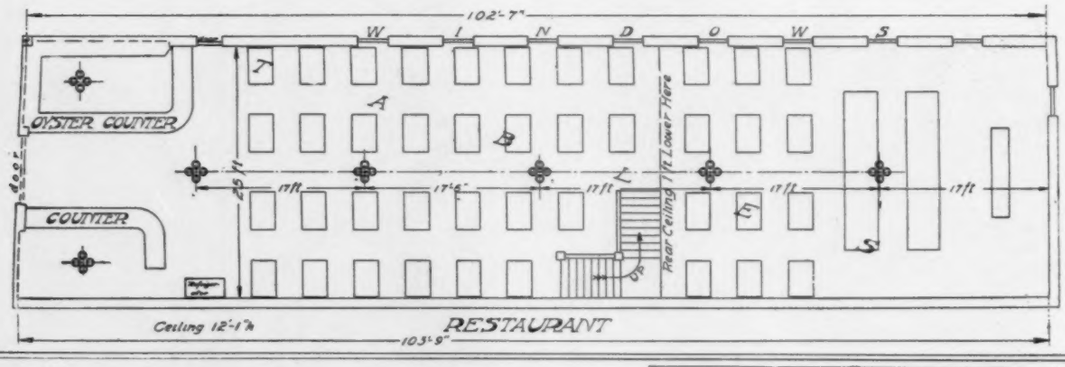

Fig. 9-B.

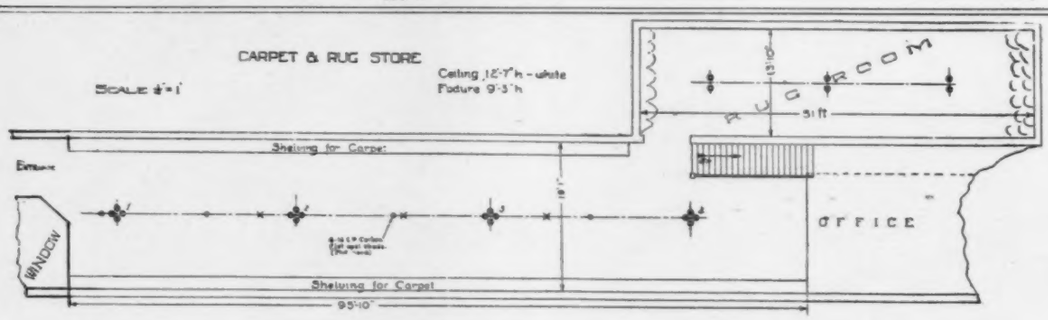

Fig. 12-A.

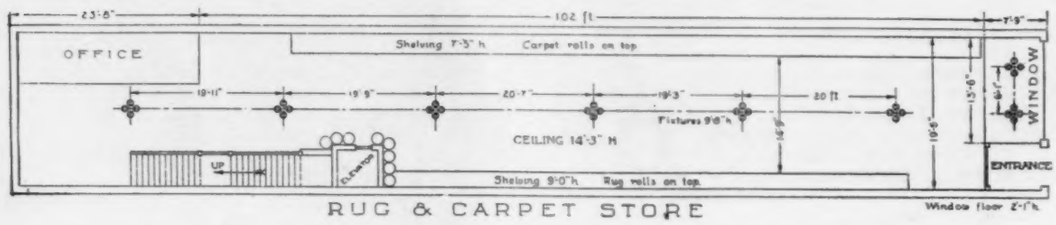

Fig. 12-B.

Fig. 11.

Fig. 13.

Fig. 14.

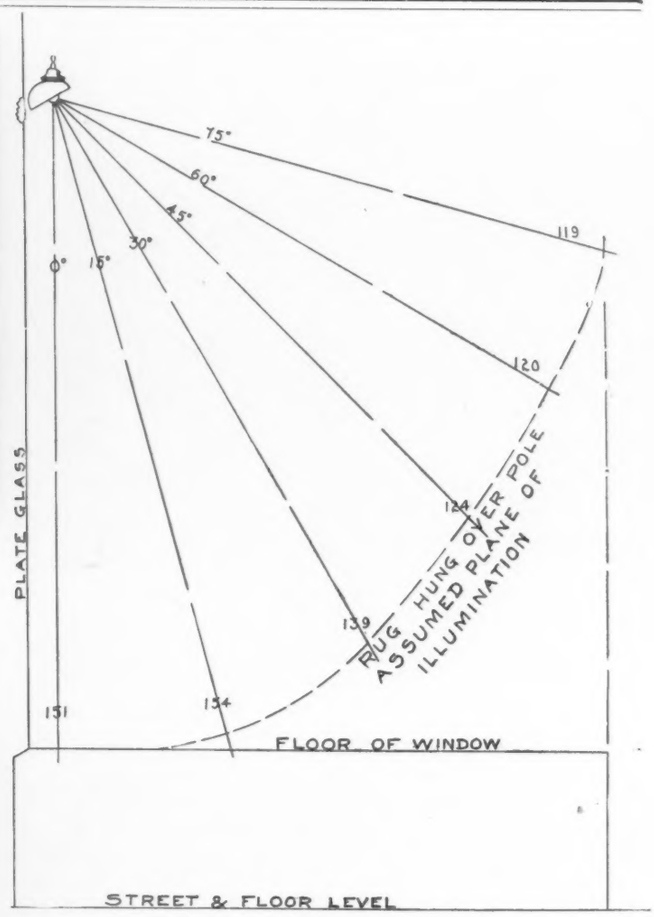

Fig. 15.

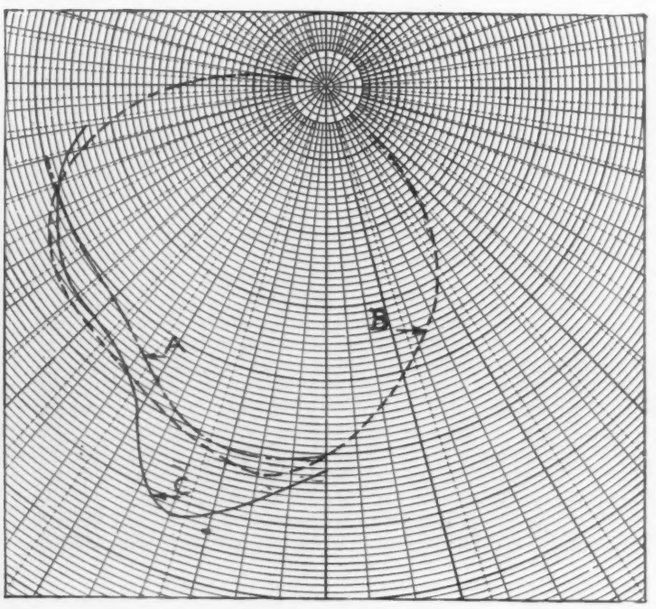

Fig. 16.

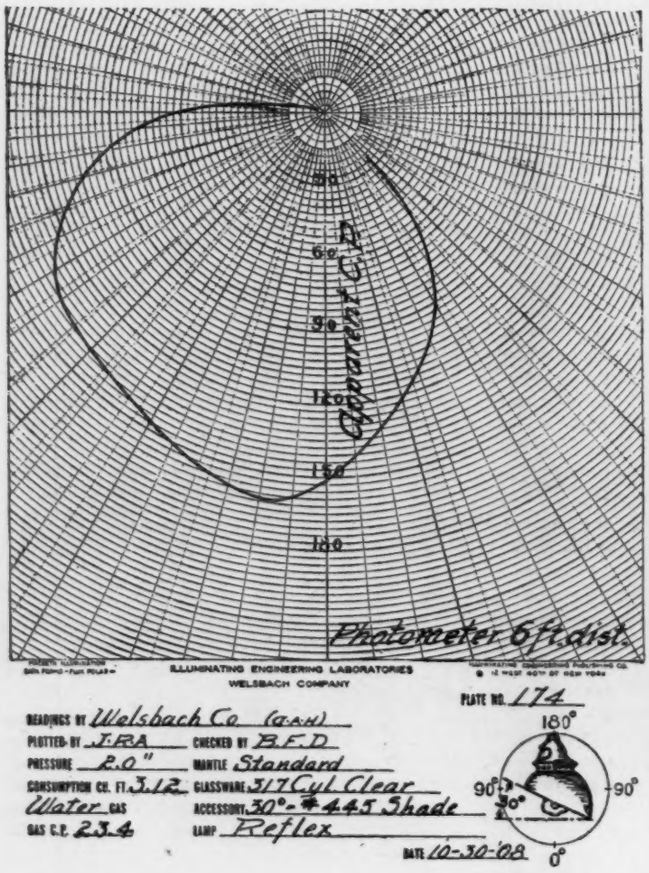

Fig. 17.

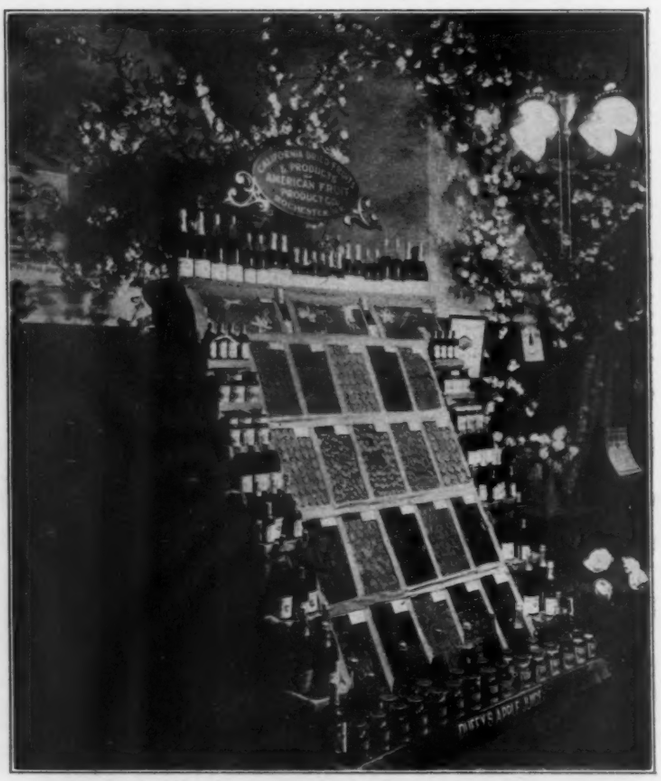

Fig. 18.

Fig. 20.

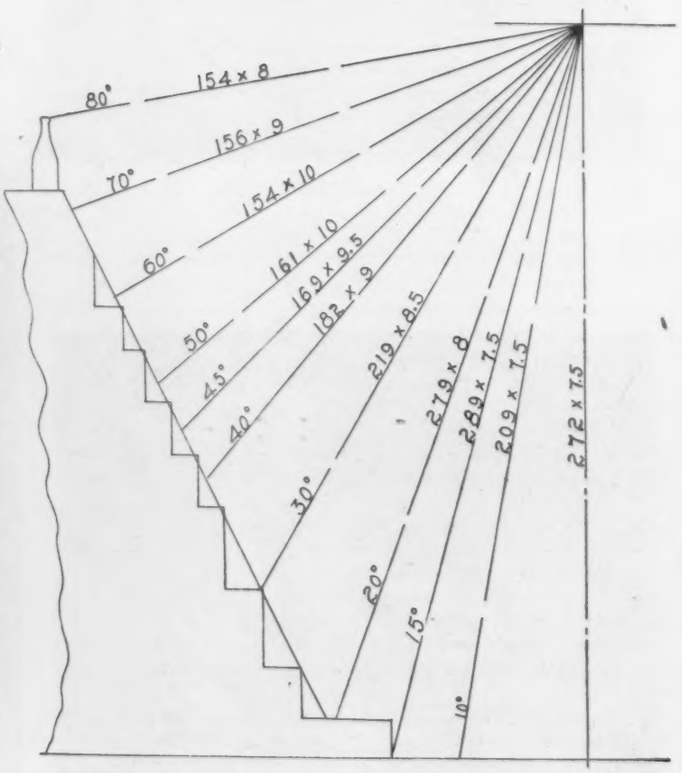

Fig. 19.

tion of approximately 20 cubic feet of gas per hour. The same factor, 100 lumens per cubic foot of gas, would apply in this section, giving 2,000 lumens effective. This divided by the area would give 3.15 foot-candles, and is too low.

Assuming a similar intensity to that desired in the other room, namely, 4½ foot-candles, the calculation would be are a (636 square feet) times intensity (4½), requiring 2,862 total lumens. With 100 lumens per cubic foot from this equipment under these conditions, we would require 28.6 cubic feet of gas per hour, and this amount, divided by the consumption per lamp, 3½ cubic feet, equals 8.6 lamps. The outlet arrangement in this room being otherwise satisfactory, it would merely be necessary to change each of these 2-light fixtures to 3 light, 9 lamps in all, hanging them at a height of 10 feet 6 inches from the floor (height = ¾ distance.) It might be added in explanation that this particular store is rarely open after 6 o'clock in the evening, and as a consequence the artificial illumination is required to merely help out in the shorter hours in the afternoon, under which conditions the present installation meets the approval of the proprietors.

In Figs. 12-B, 13 and 14 is shown another carpet house, in which the treatment from the standpoint of effective illumination is considerably better than the installation just covered. The main floor here shown is 102 feet long by 19 feet 6 inches wide. Making a reduction for elevator, stairway and shelving, the effective area is 1,395 square feet. The general effect in this store appears to be light. However, it will be noted that the heavy rolls of carpet on top of the shelving would give the effect of dark walls; that is to say, the reflection from same would be very low. The interior would, therefore, come into the classification of light ceiling and dark walls. With five 4-light fixtures installed in the section under consideration, the total consumption of gas would be 65 cubic feet per hour, and with 100 lumens per cubic foot of gas per hour (the factor for this equipment) the result would be 6,500 lumens necessary. This, divided by the effective area, 1,395 square feet, gives an effective illumination of 4.66 foot candles. This is quite satisfactory; the only criticism which may be made is that on the fixture height, 9 feet 8 inches to center of mantles, with outlets approximately 19¼ feet apart. This distance would require the fixtures to be 12 feet high. The general appearance of the room would have been improved had these fixtures been placed at this height, and the effective illumination on the floor plane would not have been reduced, but rather would be improved, judged from the standpoint of uniformity. The latter is a point of importance in a show room where comparatively large areas, carpets, rugs, etc., are to be viewed.

For the window, it may be noted, from Fig. 12-B and Fig. 14, two 4-light fixtures were installed. This method of window lighting is open to criticism. The effect and general results would have been much more satisfactory had the lamps been kept above the plate glass, well toward the front of the window, where the lamps would be out of the direct line of vision, and the light directed downward and back into the window. Reference to Fig. 15 will bring out this point more clearly.

In window illumination problems, the calculation of intensities, either by the point-to-point method, or any other method giving results in foot-candles, is practically impossible, or at least impracticable. The better method is that based on "experience factors," so-called, of cubic feet of gas per square foot of window floor area, assuming in all cases that the lamps are properly installed and equipped with reflectors of a character to direct the light properly throughout the window, with intensities proportionate to the height and depth of the window and the goods to be shown.

This method is shown in Fig. 15 and consists of laying out a sectional elevation of the window, sketching in the assumed plane of illumination, and measuring the length of the line from lamp center to this plane at the various angles agreeing with those generally used in plotting a polar distribution curve; that is, 0°, 15°, 30°, 45° and 60°. The length of these lines, squared, is then a measure of the intensity required to produce normal uniform illumination. If it is required to increase the intensity at any part of the window, a proportionate increase may be applied to these values at the corresponding angles. These values are then plotted on polar co-ordinate paper, and can be very readily compared with distribution curves of known units.

The curve from the calculation shown in Fig. 15 is given on Fig. 16 as the dot-and-dash line *A*. The dotted line *B* is the curve Fig. 17, which is the distribution curve of an inverted mantle lamp and a 30° angle shade. It then remains to place the lamps along the front of the window, the number of these lamps being determined by the calculations before mentioned. These "experience factors" vary throughout a wide range, from .12 of a cubic foot of gas per square foot of floor area to about .6 of a cubic foot.

This kind of show window should be very satisfactorily illuminated with approximately .25 of a cubic foot of gas per square foot. The area of the window, 104 cubic feet, times .25, would give 26 cubic feet of gas per hour, which divided by the consumption of the lamp, 3½ cubic feet, gives 8 lamps. These can then be spaced either at equal distances or not, as desired. An important point is to provide for ample illumination at the sides or ends; the center will be well taken care of by contributions from practically all of the lamps in the row. In spacing lamps, therefore, it should be borne in mind that if you make ample provision for the ends, the center will be well taken care of.

Fig. 18 shows a very pleasing example of special lighting. This fruit product display is on the side wall about midway to the rear in a large room, the general illumination of which is derived from very low candle power, miniature electric lamps distributed among the apple blossoms and leaves, with which the entire ceiling and walls are covered. With the high intensity on this display case, approximately 20-foot candles, and the low intrinsic brilliancy of that side of the source towards the observer, note the total absence of halation about the angle shades, this orchard-like setting with the moonlight general illumination effect as a background, results in the production of a startlingly novel and beautiful picture.

Fig. 19 is a sectional elevation of the stand, showing the graphical method of determining the position of the light source and its required distribution. This stand is approximately 7 feet high and 3 feet 6 inches deep at the base; the width is 5 feet 5 inches, and the inclination of the front is at an angle of 26° from the vertical. Assuming a lamp position of 8 feet from the floor and 6 feet distant from the top of the stand, radial lines are drawn from the center of the light source to the plane of illumination at 5° and 10° angles, as described previously for window illumination problems.

The square of the length of the radial lines, measured with any convenient scale, preferably one giving decimal divisions, will supply the values from which the distribution may be determined. In the present instance, the greatest intensity was desired at the height of the observer's eye, 5 feet from the floor, the 50° to 60° angle of the source. Taking this value as unity, the values were reduced by steps to ¾ on the bottom of the stand.

The specification curve from the values is shown as the solid line curve *C*, Fig. 16, and agrees closely with the distribution curve *B*, which is that of the unit used. The assumed height and distance of the source proving acceptable, it remains to determine the number of lamps required. The area to be considered (5 feet 5 inches by 8 feet), 44 square feet, assuming .3 cubic foot of gas per square foot, allowing for distribution losses based on a circumscribed circle inclosing the rectangular area to be illuminated, gives 13.2 cubic feet, approximately 4 lamps.

In Fig. 20 is illustrated the type of installation to which the rules and tables given cannot be strictly applied, viz., localized lighting. Uniformity of illumination is not desired, and the placing of lamps depends upon the widely varied purposes for which the illumination is required. The size of the source, intensity and direction of light, the placing and screening of same, that the eye may be protected against high intrinsic brilliancy, and other considerations, combine in making a field requiring all the experience, judging and ingenuity which the practical illuminating engineer can command.

Discussion.

The President—The papers by Dr. Hyde and Mr. Macbeth are before you for discussion.

Mr. Gartley—Just one thing and that is that the result of the scientific study of illumination has unexpectedly brought about some very important things, and has knocked on the head several pet schemes. One of the curious things that has been brought out was shown by Mr. Marks, an illuminating engineer of New York. He has shown the difference between the necessary amount of foot candles on a given surface, under daylight illumination and under artificial conditions. It will not do to measure the amount of light that you need in the daytime and say you must have that much at night, because you do not need anything like that amount at night. He has confirmed this point in some instances that he has come in contact with in practical work—he mentions the lighting of a factory where the number of foot candles that he needed at night was only one-thirtieth of what was attained in the daytime. That, of course, is supposed to be due to the fact that the retina of the eye cannot

utilize an excess of light, and depends upon the action of the iris to shut out such excess.

Mr. Clabaugh—I wish to move that we offer a standing vote of thanks to Dr. Hyde for his most excellent lecture.

The motion was seconded and carried by a rising vote.

The President—I will announce, as the

COMMITTEE ON NEXT PLACE OF MEETING,

Capt. Wm. E. McKay, Mr. J. D. Shattuck and Mr. F. W. Frueauff.

We will take up the programme again in the morning, and we will make a trial of sectional meetings. There will be a technical meeting in this hall with the First Vice-President of the Institute, Mr. Gartley, in the Chair. There will be a commercial meeting in the hall, three floors below this, with the Second Vice-President, Mr. Donald McDonald, in the Chair. I hope that each section will get out its crowd and have an extremely successful meeting. The meeting stands adjourned.

(To be Continued.)

[OFFICIAL REPORT.]

SECOND ANNUAL MEETING, INDIANA GAS ASSOCIATION.

HELD IN THE CLAYPOOL HOTEL, INDIANAPOLIS, JAN. 19-20, 1910.

INTRODUCING GOVERNOR MARSHALL.

The President convened the Association at 10 A.M., Jan. 19, and said: Gentlemen of the Indiana Gas Association, Indiana has long been fortunate in having for chief executives men who have possessed qualities of statesmanship and individuality that have brought to Indiana national renown, and to-day Indiana's Governor possesses qualifications that make him no exception to the rule. And while we delight in the obeisance which is everywhere accorded our Governor and while we note with pleasure his increased popularity, yet it has occurred to me that possibly the Governor may be disappointed in the personnel of this audience, necessitating a word of explanation. Eighteen months ago I attended the Democratic Congressional Convention at New Albany, Ind., at which place Governor Marshall was advertised and introduced as the orator of the day. He began his address by telling the audience that he was disappointed in their personnel. I being a Republican, sat up and began to take notice. You know one of the claims made by Republican officials for the preferment and advance of the Republican party is the superior intelligence and higher type of morality possessed by the rank and file of the Republican party, and, if I mistake not, I have heard Governor Marshall refer to the Republican party as the party of God and morality; but it developed that, while the Governor was disappointed in the personnel of his audience, it was not because of any seeming lack of intelligence, but because there were so few ladies present. The Governor laid the blame for this upon his press agent, who he said had caused to be distributed throughout the district, pictures that did not do his physiognomy full justice, in that his personal charms and mental charms and handsome features were not portrayed to the extent he was entitled to have them portrayed, and he stated that were he ever again to visit New Albany, he would have his advance agent, or press agent, distribute pictures that would do his mental and physical charms full justice, and then he predicted that the number of ladies who would flock to hear him would be limited only by the capacity of the auditorium. To-day I concur with the Governor, and will state that, had our wives known that he was to deliver an address of welcome, they would have insisted upon accompanying us to this convention. My friends, the Governor grows, and I want to tell you that the next time he visits New Albany to deliver a political speech the ladies will outnumber the men, having gone in advance of the opening hour and pre-empting the seats to the exclusion of the voters. I wish to impress upon the Governor that the members of the Indiana Gas Association have a strong sense of obligation in the performance of duty, and are all so gallant and attentive that, had their wives accompanied them here to-day their efforts to entertain them would have left absolutely no time for the duties of this convention. It is a very pleasant privilege this day to enjoy having with us the Governor of the State of Indiana. Gentlemen of the Indiana Gas Association, it gives me great pleasure, and I feel it is a great honor to you all, to present to you Governor Marshall. [Great applause.]

RESPONSE OF GOVERNOR MARSHALL.

Mr. President and Gentlemen of this Association: It has been said that no man is a great man to his valet. That is easily explainable; his valet knows all about him. The minister of the gospel usually wants somebody to talk to his boy about his bad conduct. That is easily explainable. The boy has got on to the curves of his father. [Laughter.] The doctor never takes his own medicine. He has seen its effect upon other people. [Laughter.] The lawyer never tries his own lawsuit, because it is the maxim of the law that he who tries his own lawsuit has a fool for a client; and, presuming that the friendly ties which unite your President and myself will warrant the suggestion, your wives are not present at this gas meeting because they have heard you gas enough at home. [Laughter.]

Indeed I am somewhat embarrassed in endeavoring to offer just a word to you this morning by reason of the fact that I myself am in the gas business, and that you people know just exactly how large a profit there is to be obtained upon so small a capital [laughter], and I want to apologize for the fact also that I had yesterday a plumber burn out one of my pipes, as the flues are not working very well this morning, so that what I shall say to you will be very brief in character.

It always gives me pleasure to meet any of my fellow citizens in the State of Indiana. I think we have reached that period in the State's history in which every man is willing to admit that every other man has his place in this government of ours, and that, as long as he does what is fair and square in that particular place, he is entitled to be a good citizen. I think the time has gone by when in Indiana a man is to be deemed essentially an honest man because he has no money in his pocket, and because he refuses to work, and that a man is essentially dishonest because he has plenty of money in bank and is at work all the time. I think we have reached the conclusion in Indiana that honesty and dishonesty do not depend either upon the position which a man has in society or upon the business in which he is engaged, but that they rather depend upon the spirit in which the man does his work.

I presume you gentlemen, as careful, thoughtful and prudent business men, more than ordinarily endowed with intellectual powers and capacities, and with a larger vision of the State's affairs than the hundreds and thousands of other men in the State, have been impressed with the fact that, as the years go by in the State of Indiana, the problem of fuel and of heat is becoming a much greater problem than it ever was before in the history of the people in this State.

Many people are now complaining that the vast forests of the State of Indiana have been cut down, that they are here no more; and there are large numbers of people who are insisting that some plan must be devised by the State of Indiana whereby the farmer, with land worth $150 an acre, out of which he is making $30 or $40 an acre each year, in the raising of wheat and corn, shall deliberately quit raising wheat and corn and shall plant trees and let them grow, so that his great-great-grandchildren may have fuel. I do not believe, gentlemen, as philanthropic and patriotic as are the people of the State of Indiana, that you are going to find a class of citizens who will do that.

I think also you are aware of the fact that the coal of Indiana is not being absolutely wasted, but that a large proportion, I am told, is going up in smoke, it is not going into heat. I hope some genius—perhaps one who is sitting in one of the seats before me this morning—one of these days is going to devise a plan whereby this heat instead of going up into the atmosphere will go under the boilers in Indiana and will thus conserve the coal supply. In the meantime, as I understand it, most of you gentlemen are engaged in the manufacture of gas, and all of you are interested in such manufacture. Now, if you will bring to bear on that problem not only the best of your business ability, but all of the scientific knowledge and information you can obtain, you will be thereby enabled to conserve the coal supply of the State of Indiana, and will be enabled to manufacture gas at a cheaper price than you are making it now, and by furnishing it in a cheaper way, you will not only be doing a lawful thing in the State or a right business, but you will also make of yourselves public benefactors.

I myself, gentlemen, have not been much in favor of government by commission. I am frank to say to you, again disagreeing with the President of this Association, that I have been an old-fashioned Democrat; but I do not want to talk politics to you now, because I do not know enough to tell you anything on that subject; but I have been an old-fashioned Democrat and have believed in the three departments of government—the executive, the legislative and the judicial—and I have believed it was the business of the Legislature to enact law, of the courts to construe it and of the Governor to enforce it. Therefore, I have not been enamored at any time of com-

missions—commissions of any kind—and I will tell you why: I think that these commissions are inclined to subvert the very principles upon which this government of ours rests. What is a commission? What would be a gas commission? For instance, in the State of Indiana it would be a body of men who would do what? First, they would enact a law, or a rule, or a regulation, which is the same thing as a law, which you gentlemen would be required, all of you, to obey. Then, if you broke that law, what then? These same gentlemen who passed the law would take you up and try you for the violation of their own law, and they would be very likely, I want to say to you, to find you guilty. And after they had found you guilty they would proceed themselves to enforce their own decree.

Now, I am not saying that commissions now and then are not necessary in the administration of affairs in a government such as ours; but I am saying that, in so far as commissions can be avoided, commissions should be avoided, because, by the very inherent creation of them, you have drifted away from a democratc form of government and you are making a pure oligarchy, an aristocracy, out of the commission which makes the law, tries the case and enforces the decree. Therefore, gentlemen, I have not been in favor, wherever it could be avoided, of the creation of commissions to take charge of the affairs of the people. I think the whole trouble, for which no one particular party has been to blame, but for which the entire body of the people have been to blame, is this: We have been trying to do business through Legislatures, when, as a matter of fact, we ought to do business in the public heart of the country and let the Legislatures simply take care of the rights and wrongs of the people; and the time will come, gentlemen, when, not by commission, but by statutory enactment, all public service corporations will be required to keep and maintain their plants at the very highest degree of efficiency; will be permitted to expend such money as they choose to expend in the betterment and enlargement of their plants; will be permitted to draw a reasonable amount of money upon the investment which they have made, varying from 6 to 10 per cent., in accordance to the dangers and difficulties of the business, and then I believe that, instead of commissions, instead of hampering men in their business affairs, it will be the law of this State that, if you make a surplus beyond that, you will simply pay it into the treasury of the State of Indiana. And thus, gentlemen, by the automatic action of the law, you will be thoroughly protected in your business interests, and at the same time the public will be protected against the greed and rapacity of any man. And this interest which comes to you must be one that is regularly paid each and every year; that if there be a failure to make it out of your business this year, it ought to pass over to your business next year, when you get it. That is substantially the railroad law of Massachusetts. It works perfectly. The State is in no way interfering with the private business of Massachusetts. They are charging what they please for the transportation of passengers and to carry freight, and they are permitted to put what they please into repairs and improvements, and then they are drawing 8 per cent., a fixed, certain, definite amount upon their stock; and after that, if they charge more it goes into the treasury of the State, and thus automatically the people are being protected from the greed and rapacity of the railroad managers of the State of Massachusetts.

Now, I do not know that that has a single thing to do with your business. I doubt whether it has anything in the least to do with your business. I suppose you do admit that human nature is much the same in this world, and that we have had recently to find out that a reasonable profit to the manufacturer is anything that the manufacturer can get Congress to give him, and I suppose there is nothing to complain about in it. I am not asking men to be angels, and I am not asking men to go into business and just voluntarily give away out of their own pocket to the public good. I would not do it myself. I want to say to you that I believe a man has a right to make all that he can make, but whenever he comes and asks of the State or of the United States a franchise that gives him rights and privileges which the individual citizen cannot obtain in any community, then the public ought to be safeguarded to the extent that when you have made a reasonable profit you should not make more than that off the people of the State.

Now, I do not know that that has anything to do with your business, and I do not know whether you like that, gentlemen; if you do not, I am sorry, because if there is anything in the world I like it is to have everybody think I am a good fellow [applause.] I have found out already that the most difficult thing in this world is to ride astraddle of any public question. On all public questions we ought to be ladies, we ought to ride on side-saddles [laughter], and I believe that your sober common sense, if your business is going to increase in the State, as I hope it will and prosper—I believe that your sober common sense will lead you to consider the question as to whether or not the future, instead of being controlled by a utilities commissions, it would not be advisable to have a law that will let you control yourselves and run your own business, and that will automatically fix and definitely give to you a certain profit upon your investment rather than to be at the caprice of some men who may want to punish this fellow and help that fellow.

I think there is another question, gentlemen, about which I spoke to the miners yesterday, to which I have no very fixed or definite objection, but which I think I ought to consider, and that I am sure will be of some moment to you. I think that the question of an employers' liability law must soon be considered in the State of Indiana. A law in which we wipe out forever the question of contributory negligence. A law in which there shall be fixed payments made for injuries; so much for the loss of an arm, just like one of these insurance policies—a little better than insurance policies, because I carried one and I ran a pin in my finger the other day, and I had it swathed in purple and fine linen and creosote for 4 weeks, and I could hardly hold a paper, but because I did my work I discovered I was not entitled to any damages. I ought to have gone home and gone to bed to be entitled to any damages. [Laughter.] But so much for the loss of an arm, a leg, an eye, and so much for the death of a man, and I believe that when you consider that question, manufacturers of Indiana, you will find it will be a good thing for you. I know it will be a good thing for the laborer, because, while I never was an ambulance chaser, I used to have some damage suits against corporations, and I know that the widow and I always stood on the same platform, we stood side by side, 50 for the widow and 50 for me [laughter], and I know that by the time we got through the Supreme Court I had my 50, and the poor old widow's 50 has shrunk to 25, so that I can definitely say that although a widow at the end of litigation through the courts of Indiana should receive a judgment, confirmed by the Supreme Court, of $10,000, that that widow would be infinitely better off than if, 10 days after the death of her husband, $2,000 should be put into her hands.

This is for you to consider, because I will not have any law enacted while I am Governor that is going to be to the detriment of any one man in the State of Indiana [applause]. It is a question for you to investigate, whether or not the amount of counsel fees and the amount of insurance you pay, will not amount to more than the payment of a fixed sum for injuries. When you get the statistics of injuries in the State of Indiana, the number of deaths, and all that, and figure then up, and figure the expense as things now are, it is a problem whether or not it would not be cheaper for you to pay this fixed amount, to have a law of that kind and thus eliminate all this expense. For illustration. A friend was sued by an ambulance chaser for the loss of an arm. We fought that case and when my friend was through he was $4,900 out—that is what it cost him. He would infinitely better have paid $1,000 for the loss of the arm. This is just a suggestion, because all the manufrcturers of Indiana are interested in these problems. I do not know about them myself; these are personal impressions. I am not going to advocate anything of that kind until I find it will be mutually helpful to the manufacturer and to the employee, but if I find that it is mutually helpful to both, then I am in favor of it, and I think you are too. But I am drifting away from gas and just making it here, but it can neither be sold nor burned, it is solely worthless. I am glad to be looking into your smiling faces to-day, and believe, as I do, that you have not only the welfare of your business, but of the State, at heart. I believe you are proud of old Indiana, and I know that old Indiana is proud of her business men wherever they are encountered, because I think I can safely say that this one thing may be said of the Indiana manufacturer and business man, that he will sell for delivery in the port of Hong Kong, and there deliver as good a product as he will lay down by his next door neighbor's gate [applause]. That I believe is the attitude of the business men of Indiana.

And so, gentlemen, I bring to you the greetings of the State and my personal greetings, and my desire that in your gettings you get wisdom, get business, get money, get the good things of life, but, in addition to that, gentlemen, get wisdom, that wisdom which says that in the discharge of your duty in life, if you will remember there is some other man besides yourself who is likely to be affected by what you do, you will not only have peace at home, but you will have peace abroad, and you can look every man in the face and you will not be afraid that any man looks down on you as being a mean

and evil-minded citizen. So, gentlemen, I thank you for the opportunity of having stood before this convention, and I bid you enjoy yourselves. Your are in the best hotel here. Some of the profits of your Company will be left in Indianapolis. The longer you stay, the more profits you will leave here and the less to divide among the stockholders at home. Stay here just as long as you please and have just as good a time as you please, barring prize fighting and gambling, and if any trouble comes to you, call on me. [Great applause.]

The President—Governor, we do not wish to let you go without stating that every man in this audience believes you to be a "good fellow." Every man in this audience is proud of Indiana, and certainly proud of the distinction and honor you have conferred upon us this day by coming to deliver to us an address of welcome. And we wish for you and yours all the good and preferment that may come to any man.

Gov. Marshall—I am obliged to you, gentlemen.

(To be Continued.)

The Claim Department's Interest in New Business.

[Prepared by Mr. James B. Douglas, Philadelphia, Pa., for Fifth Annual Meeting, National Commercial Gas Association.]

Information of value pertaining to the claim work of the gas company in general may be easily gathered, owing to the scope of the subject. It is, however, rather difficult to "deliver the goods" when endeavoring to confine a paper to phases of accident, and claim work relating only to the commercial or new business department, as is being attempted in this instance.

The number of accident and damage cases contributed by the commercial depariment is bound to increase decidedly, because of the strenuous campaigns for new business now being waged by all up-to date companies. It is, therefore, both important and timely to offer a few statements and suggestions respecting the claim department's interest in what may be termed commercial accidents.

At the outset one may say to advantage that it is of the utmost imporiance to the gas company to have its commercial and claim departments working in perfect harmony. While co-operation between all departments is necessary, it is of the greatest value to a company when existing between the departments coming into direct contact with the public. Employees of both departments should bear in mind that their interests in the end are identical, and that the help given one by the other is for the good of their common cause—the success of the company as a whole.

One of the greatest mistakes the commercial man can make, from the viewpoint of the claim department, is to underestimate the possible cost of a seemingly trivial personal injury case, and consequently to allow it to pass unreported. Personal injury cases at times grow, even over night, to tremendous proportions. The majority of cases appearing important at the outstart will take care of themselves, in that they will in the natural course of events reach the claim department with reasonable promptness. It is, therefore, the unreported and seemingly trivial cases, with dangerous possibilities and subjective or unapparent symptoms, that the claim department has the greatest difficulty in handling. Claims based on cases of this type, brought to the surface and pressed months after their origin, find the claim department embarrassed through having no report on which to start an investigation. These facts, and the serious consequences at times following failure to report such cases, cannot be too strongly impressed upon the employees of the commercial department. (Reporting these cases, it should be remembered, does not necessarily mean that an investigation will follow.)

In the education of employees of the new business or commercial department too little attention, as a rule, is devoted to familiarizing them with their department's interest in accident cases, and the dangers following a lack of knowledge of what to do and when to do it. Often it is quite evident that the judgment shown by the employee to whom a consmmer first makes complaint or claim has a most important bearing on the disposition of the case by the claim department.

The fact that a little carelessness or inattention upon the part of a canvasser or demonstrators may be the cause of the claim department making a heavy expenditure in a case that otherwise would have been inexpensive should be clearly pointed out and emphasized to all employees. In many companies the profits of an entire year may be dissipated, or thrown to the wrong side of the ledger, through lack of knowledge of the ordinary precautions operating towards the prevention of accidents.

From the foregoing it is evident that in the training of men for the commercial department of the gas company serious regard must be given to the subject of accidents if the best results are to be obtained. It is also obvious that each employee coming in contact with the public should be quick to note and report any evidences of claims coming within his observation.

At times, in the rush of work, the proper use of industrial and household appliances may not be fully explained by the representative of the gas company and as a result the company may have to contend with claims based on explosion or asphyxiation cases. After such accidents the consumer not unnaturally entertains fears as to whether the appliance may be safely used. It is then, of course, much more difficult to satisfy him—especially when a personal injury claim has to be contended with. The company has then also to meet and counteract the harmful advertisement that such cases draw to the use of gas. A single explosion or asphyxiation case is very likely to adversely affect the use of appliances in an entire neighborhood.

Therefore, in addition to promoting sales, if the commercial department sees that the use of the various appliances is thoroughly understood, it helps the claim department in its endeavors to keep down the number, the cost and the bad effect of accidents. As a matter of fact, the greatest help the claim department can have in certain cases is that coming from the other departments of the company, either in the form of suggestions on technical points arising in the building of a defense or in the following of methods designed to eliminate accidents.

Much has been accomplished recently toward raising the type of the new business solicitor. Those in charge of commercial departments are fast realizing that the best business-getter is the man who, in addition to an ability to sell goods, is invariably capable of being courteous and polite to the public. It is largely to the factors of courtesy and politeness that the company owes its hold on the consumer's goodwill.

By employing men of higher standards to fill its vacancies the commercial department still further aids the claim department. In the handling of certain cases the latter finds the ill-feeling of a consumer engendered by apparent indifference or neglect upon the part of an employee, a most difficult feature to contend with. The more satisfactory service now rendered the public by employees of higher standards of efficiency is fast over-coming this obstacle. The cost of a case at times depends largely upon the manner of the inspector or canvasser. As an illustration, if, upon hearing a consumer's statement of claim, this employee shows a personal interest in the story, he naturally causes the consumer, notwithstanding his grievance, to feel more kindly disposed toward the company. Further, it is then possible for him to obtain a more complete statement of facts from the consumer and to well pave the way for the call of the claim department's representative. The claim department in many instances cannot obtain these facts later, when on second thought the claimant is disinclined to give the investigator the necessary data.

The possibility of accidents occurring should be carefully considered in connection with the designing and installation of appliances. Especially constructed industrial appliances should without exception be thoroughly tested out before being set up for the consumer. The fire hazard incident to the hanging of arc lamps under or through awnings, as well as the accident hazard consequent to the connecting of appliances in small and poorly ventilated rooms, should also be fully considered.

The elimination of many accident and damage cases is a matter of forethought and inspection. Although accidents are an evil to be reckoned with in every industry, the good that can be accomplished toward their prevention is surprising. To this end each case should be carefully reviewed in search of a lesson which will prevent its repetition, and notes on these lessons should be widely distributed. A number of suggestions which, if followed, will help to prevent commercial accidents, are listed below:

Guard or close trap doors opened by employees.

Care in adjusting arc lamps to prevent fall of glass on persons below.

Avoid placing globes, tools, etc., where likely to cause persons to stumble.

Avoid placing tools on ladders.

Keep sidewalks fronting company's office, etc., clear of ice. Remove icicles.

Keep rugs and mats secured to floor. Discard those worn out.

Have meter readers see that meter shelves are secure.

Warn employees riding bicycles, motorcycles and in automobiles against speeding.

Care in entering dwellings to avoid knocking over vases, stands, etc.

Guard against the fall of bricks, spouting, etc., from company's buildings.

Avoid permitting glass and other doors to slam.

Keep floors and steps in repair and free of obstructions.

From the above it will be noted that ordinary common sense is the ruling factor in the prevention of accidents. In closing, I would suggest that the companies here represented keep each other informed from time to time of the means adopted to prevent the repetition of all serious accidents coming under their observation. I presume this could be arranged for through the Secretary of the Association.

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

BUREAU OF INFORMATION, THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, GAS OFFICE BUILDING,
V. F. DEWEY, Chairman. DETROIT, MICH., Jan. 17, 1910.

These questions (Nos. 59 and 60) by the Bureau of Information were accidentally misplaced. They should have gone in the Association's budget for last week.—EDS. A. G. L. J.

Following are two questions submitted to the Bureau of Information for answer:

Question No. 59.—"What relation exists, in the operation of a water gas machine, between the amount of air per minute, per square foot of grate area during blast, and pounds of carbon per 1,000 feet of gas made, and make of gas per hour?"

Question No. 60.—"What simple and efficient benzole vaporizer is there on the market capable of enriching 100,000 cubic feet of ordinary coal gas, per hour, 2 candles?" Respectfully yours,

V. F. DEWEY, Chairman.

Correspondence.

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

A Man from Abroad and His Newsy Letter.

While we are quite sure that Mr. Harper did not mean that this useful letter should be published by us, we will take the chance, in the knowledge that its publication will prejudice no one. The letter, which was posted from Macpherson's Hotel, Naples, Italy, the 23d ult., is as follows:

MACPHERSON'S HOTEL, BRITAINIQUE,
NAPLES, ITALY, Jan. 23d, 1910.

My Dear Editors: I arrived here yesterday, per the Steamship "Caronia" from New York. On picking up the London *Times* this morning, I encountered the clipping inclosed, thinking perhaps you could use it. I am planning to spend about a month in Italy, and from here to Paris, for a short while, then over to London, with the thought of making home about March 12th. I've just had the proper sort of moisturer, in company with an old friend, wherefore I am feeling fine. With kind regard, I am, yours truly,

H. D. HARPER.

The clipping, which is headed "The Cost of Gas Lighting," is as follows:

To the Editor of the *Times*—Sir: In an article on "Concentric Wiring and Metal Filament Lamps," from an electrical correspondent in the *Engineering Supplement* to the *Times* of the 12th inst., a statement is made that "metal filament lamps, if properly installed, provide a cheaper and healthier light than gas mantles." This, to say the least of it, is a very erroneous assertion for any electrician to to make, unless he added that the comparison was with gas at at least 5s. per 1,000 cubic feet, a price which is only charged in villages. The circular I send herewith shows the comparative cost of gas and electric lighting in Sheffield, and by it you will see that with the metal filament lamp electric light is 4 times as dear as gas with the incandescent mantle. Mr. F. H. R. Lavender, in a paper which he recently read before the Birmingham local section of the Institution of Electrical Engineers, gave a table showing the results of tests of 6 metal filament lamps with an initial candle power varying from 21.5 to 31.2, wherein he showed the *maximum* cost per 1,000 candle hours to be 8.8d. and the *minimum* 5.6d., with electric current at 4d. per unit, whereas the cost of 1,000 candle hours for an incandescent gas burner is rather under 1d., which more than bears out the figures shown in the inclosed circular.

With regard to the hygienic aspect of the two forms of illumination, the researches of Dr. Rideal, Mr. Hehner and others have abundantly proved that gas has nothing to fear from comparison with electricity. Although some amount of carbonic acid is produced by the combustion of gas, the air of a room is not necessarily contaminated thereby, as the heat from the burning gas assists the natural ventilation and promotes the egress of foul and the ingress of fresh air. Moreover, the idea that carbonic acid is itself poisonous has long ago been exploded. It is the poisonous products of respiration that are associated with it, when evolved from human beings, which make the atmosphere of a crowded room impure. Whereas one can breathe with impunity an atmosphere containing 100 parts of carbonic acid per 10,000 parts of air, one of 10 parts per 10,000 due to the respiration of human beings would be highly dangerous.

It is a pity that electricians should make these very misleading statements, and I do not think that this pays in the long run, as in many cases, not only in Sheffield, but in other parts of the country where gas is dearer than here, the electric light is replaced by gas on the ground of expense. Yours faithfully, HANBURY THOMAS.

Sheffield United Gas Light Company, Sheffield, Jan. 14.

[The circular referred to by Mr. Hanbury Thomas states that with current at 4d. a unit the cost per hour of a 16-candle power carbon lamp using 60 watts is ¼d.; of a 32-candle power osram or other metallic filament lamp using 40 watts, ¼d.; and of a 50-candle power osram or other lamp using 62 watts, ¼d.; whereas a 60-candle power incandescent gas burner using 4 cubic feet of gas at 1s. 4d. per 1,000 costs $\frac{1}{15}$d. per hour, and a 60-candle power inverted incandescent gas burner using 3½ cubic feet at the same price, $\frac{1}{15}$d.]

Meeting Times of the Various Gas Associations.

American Gas Institute.—Annual meeting, October, 1910. Atlantic City, N. J. Officers: President, Wm. H. Bradley, N. Y., City; Secretary, A. B. Beadle, 29 West 39th street, N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1910. Hamilton, Ont Officers: President, J. S. Norris, Montreal, P. Q.; Secretary and Treasurer, A. W. Moore Woodstock, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March 18, 1910, Chicago, Ills. Officers: President, E. G. Schmidt, Springfield, Ills.; Secretary-Treasurer, C. B. Strohn, Elgin, Ills.

Illuminating Engineering Society.—Annual meeting, January —, 1911. Meetings of Sections, monthly. President, W. H. Gartley, Philadelphia, Pa.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets. Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mullholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June 23, 24, 25, 1910, Sioux City, Ia. Officers: President, Geo. H. Waring, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, September, 1910; ———— Officers: President, B. O. Tippy, Grand Rapids, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 14, 15 and 16, 1910; Jefferson City, Mo. Officers: President, W. A. Bixby; Secretary and Treasurer, C. L. Clary, Sikeston, Mo.

National Commercial Gas Association.—Annual meeting, third week in October, 1910: Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Louis Stotz, Broad and Arch streets, Philadelphia, Pa.

Natural Gas Association.—Annual meeting, May 17, 18 and 19, 1910; Oklahoma City, Okla. Officers: President, William H. McKenzie, Kansas City, Kas.; Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, Walter G. Africa, Manchester, N. H.: Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Electric Light, Railway and Gas Association.—Annual meeting, May 18, 19 and 20, 1910; Oklahoma City. Officers: President, F. H. Tidman, Oklahoma City, Okla.; Secretary-Treasurer, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April 13, 1910, Easton, Pa. Officers: President, E. G. Holzer, Easton, Pa.: Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

Southern Gas Association.—Annual meeting, Feb. 16, 1910, Chattanooga, Tenn. Officers: President, R. C. Congdon, Atlanta, Ga.; Secretary-Treasurer, James Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. ————, 1910, Beaumont, Tex. Officers: President, R. B. Stichter, Dallas, Tex.; Secretary's office, 300 Commerce street, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 11 and 12, 1910, Milwaukee, Wis Officers: President, R. B. Brown, Milwaukee, Wis.; Secretary-Treasurer, H. H. Hyde, Racine, Wis.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

946,755. Printing Device for Meters. P. N. Golden, Elizabeth, N. J.

948,820. Gas Producer. T. Clouston, Vancouver, British Columbia.

946,961. Bill Delivery Mechanism for Meters. R. W. Gallagher, San Francisco, Cal., assignor to Automatic Billing Company, Los Angeles, Cal.

947,014. Gas Burner. H. C. Faber, Monongah, W. Va.

947,042. Gas Valve. A. S. Lindkwist, Springdale, Pa.

947,065. Gas Producer. J. C. and J. A. Swindell, Pittsburgh, Pa.

947,118. Gas Producer. W. R. Miller, Pittsburgh, Pa.

947,152. Apparatus for Automatic Extinguishing of Lamps after a certain time. E. A. Fagerlund, Stockholm, Sweden.

947,283. Method of Manufacturing Incandescent Gas Mantles. E. Ross, Barmen, Germany.

947,323. Gas Generator. C. E. Beeman, Minneapolis, Minn., assignor to the Hygienic Refiner Company, Princeton, Minn.

947,572. Gas Generator. E. R. Dull, Chicago, Ills.

947,753. Burner Support for Gas Ranges. H. P. G. Norstrand, Albany, N. Y., assignor to Rathbone, Sard & Co., same place.

Items of Interest
FROM VARIOUS LOCALITIES.

AT the annual meeting of the Lynn (Mass.) Gas and Electric Company these gentlemen were elected Directors: Jno. S. Bartlett, A. W. Pinkham, Chas. F. Prichard, C. T. Purington, B. N. Johnson, E. B. Fraser, M. P. Clough and Chas. H. Baker. The only change in the Board is the naming of Benjamin N. Johnson, who succeeds the late Hon. F. D. Allen. The Board subsequently perfected the following executive organization: President, Jno. S. Bartlett; Vice-President and General Manager, Chas. F. Prichard; Clerk and Treasurer, Eugene B. Fraser.

ON February 2d the Islip (L. I.) Town Board will consider an application from the Odell syndicate for the right to operate the Sayville Gas Company in the village of Sayville. Sayville is quite a pleasuring resort on Long Island, N. Y., about midway of Babylon and Patchogue; also, is the home of the village baker (Mr. Haeuser) who was swept into the office of Treasurer of the State of New York during the Murphy-Hearst political tidal wave of 1906. It would look that the logical way for Sayville to get its gas would be to have it piped over from Patchogue.

THE Gas Engineering Company, of Trenton, N. J., has filed articles of incorporation with the Secretary of State, of New Jersey. It is capitalized in the sum of $100,000, and its incorporators are: Thomas Watson, Jr., Aaron Gibert and Andrew Lovett. As the first named is Secretary to Mr. Frank D. Moses, the identity of the Company is not deeply hidden.

THE proprietors of the Orange County Gas Company and of the Home Gas Company, of Fullerton, Cal., have informed their patrons that the selling rates have been increased to $1.25 per 1,000 cubic feet. The heretofore rate was $1.

IN a very carefully itemized statement the Binghamton (N. Y.) Gas Works Company has petitioned the Public Service Commission for permission to issue 50-year 5 per cent. bonds in the sum of $23,000. It is pointed out that of the proceeds $10,554 will be expended on plant improvements, the balance ($12,446) to go towards improving the service.

SOME days ago, according to a summary of its affairs forwarded to its shareholders, the Lincon (Neb.) Gas and Electric Company's gross earnings were $364,249, against $351,265. The net earnings, respectively, were: $127,901 and $114,216.

THE Lynn (Mass.) Gas and Electric Company has petitioned the Board of Gas and Electric Light Commissioners for authority to issue $150,000 new stock at $235 per share.

MR. RICHARD C. GRAVELEY, of New Orleans, La., and recently Superintendent of the Hanover (Pa.) Gas Company, has been appointed Manager of the Burlington branch or district of the Western United Gas and Electric Company, with headquarters at La Grange, Ills.

MR. JAMES L. RICHARDS, President of the Boston (Mass.) Consolidated Gas Company, has been elected a member of the Boston Chamber of Commerce.

ARRANGEMENTS have been satisfactorily concluded, the operation of which merges the interests of "Industrial Engineering," of Pittsburgh, Pa, and the "Engineering Digest," of New York. We note with great satisfaction that the editorial management of the combined publications will be in the custody of Mr. Robert Thurston Kent.

AT the annual meeting of the Gas Workers' Local, of Sacramento, Cal., the officers elected were: President, I. Thompson; Vice-President, C. B. Green; Secretary, P. W. Martin; Treasurer, D. Borms; Guardian, J. W. Clarke; Guide, S. Holmes; Trustees, T. Johns, S. Holmes and J. E. Waters; Delegates to District Council, C. W. Martin and C. H. Green; Delegates to Federal Trades' Council, G. S. Estry and C. F. Williams.

IN the merger of the properties heretofore owned by the Suburban Gas Company, of Philadelphia, hereafter to be operated under the title of the Philadelphia Suburban Gas and Electric Company as a subsidiary property of the American Gas Company, Mr. J. D. Shattuck was appointed Manager. This is as it should be, for he did a yeoman's work, under Mr. Fred. H. Shelton, when that astute and clever business man was getting together the threads that stitched up the gas supply of the beautiful valley of Chester in so sensible fashion.

THE Citizens Electric Light Company, of Port Townsend, Wash., has at last made a businesslike move, in that it has purchased the edtire ontfit of the Port Townsend Company. The transfer became operative the 1st inst.

AT a meeting of the Board of Directors of the Lincoln (Neb.) Gas and Electric Light Company the officers chosen were: President, A. H. Armstrong; Vice-President, F. W. Frueauff; Secretary-Treasurer, Henry Warner; Chairman Executive Committee, H. L. Doherty. No dividend was declared, the proprietors taking the sensible view that the money might better be distributed through a continued improvement of the distributing system.

CONTRACTS for the construction of the works of the South Side Gas Company, of Phœnix, Ariz,, have been awarded to E. McGillivery, of Los Angeles, Cal. The buildings are to be completed by June 1st.

THE first payment by the Gage County Gas Light and Power Company, of Beatrice, Neb., under the royalty agreement between the Company and the authorities, amounted last year to $600.

AT the annual meeting of the Yorke (Neb.) Electric Light, Power and Gas Company, Mr. Joel Roberts resigned the position of Manager, in that he found the duties connected with his position too exacting, and Mr. Charles Peffer was chosen to succeed him. Mr. G. W. Shreck was elected Vice-President.

MR. J. A. MCARTHUR has been elected to succeed Mr. R. E. Slade as Secretary and Treasurer of the Hartford City (Conn.) Gas Light Company.

AT a meeting of the shareholders in the Hartford City Gas Light Company, held Jan. 26th, these resolutions were adopted:

Resolved, That this corporation increase its capital stock from $750,000 to $1,500,000 by the issue of 30,000 additional shares of preferred stock of the par value of $25 a share, said preferred stock to be entitled to cumulative dividends at the rate of 8 per cent. per annum, quarterly dividends of 2 per cent. to be paid thereon before any dividends are payable upon the common stock of the Company, the first quarterly dividend of 2 per cent. to be payable April 1, 1910, said preferred stock, in the event of liquidation of the corporation or distribution of its assets, to be preferred as to the entire assets to the amount of $50 a share; all shares, whether of preferred or common stock, to have equal voting rights and equal right to participate in subscriptions to any future increase of capital stock; and

Resolved, That said additional shares of preferred stock be offered to the present stockholders of record at $25 a share; and

Resolved, That the Directors be and they hereby are authorized and empowered to receive subscriptions for said new shares and to determine in their discretion the times within which such subscriptions shall be received and the payment therefor be made, and upon full payment therefor to issue or cause to be issued certificates therefor, provided that the right to subscribe for said shares shall not be offered otherwise than to the stockholders of this corporation or their assigns in proportion to their stock holdings and for $25 a share; and

Resolved, That the Directors of this corporation be and they hereby are authorized and empowered in their discretion to purchase or cause to be purchased from time to time any or all shares of the preferred stock of the Hartford Gas Securities Company, which may be offered to this corporation by Security Company, of Hartford, Conn., at a price not to exceed $25 a share, and from time to time to sell and deliver any or all of the shares so purchased to the Hartford Gas Securities Company for a price of not less than $25 a share.

THE selling rate of 90 cents per 1,000 cubic feet all round became effective in Providence, R. I.. the 1st inst. Those who fail to settle their bills within 10 days after presentation thereof will be obliged to pay $1 per 1,000.

MR. RICHARD J. LOCKE, in the employment of the Gloucester (Mass.) Gas Light Company since 1873, died at his home in Prospect street, Gloucester, the morning of the 26th ult. Most of his time was taken up in the meter and distribution departments, the latter in a general way. He was a native of Ash Hill, Norfolk, England, and came to this country in 1873.

AT the annual meeting of the Binghamton (N. Y.) Light, Heat and Power Company the Directors elected were: Col. George W. Dunn, and Messrs. C. F. Hotchkiss, Geo. F. O'Neill, T. B. Crarey, B. S. Lochlan, W. H. Evon, Chauncey Eldridge, T. M. R. Mickleham and P. T. Glidden. The Directors elected the following executive management: President, Col. Geo. W. Dunn; Vice-President, P. T. Glidden; Secretary, B. S. Lochlan; Treasurer, W. B. Dinsmore.

ONAWA (Ia.) had an unpleasant experience the nights of Jan. 26 and 27. Not a pound of coal could be bought the nights named. During the named period the electric lighting plant was forced to shut down.

AT the annual meeting of the shareholders in the Swedesboro (N.J.) Gas Light Company, the officers elected were: Directors, C. D. Lippincott, A. B. Hughes, G. B. Mitchell, H. R. Locke, L. H. Vanneman, B. P. Lawrence, C. S. Crispin, H. W. Ridgeway, T. C. Rulon, S. S. Grant, C. E. Jones, N. K. Shremker and W. S. Conner; President, W. S. Conner; Vice-President, C. D. Lippincott; Secretary, H. W. Ridgeway; Treasurer, M. E. Rulon. These Swedesboro men seem to have done remarkably well with this undertaking. About 13 months ago the work was put into commission; and besides having paid interest on the bonds out, it has also earned and paid a small dividend on the ordinary shares.

W. K. TRAINER, writing from Portland, Ore., under date of the 26th inst., says: "There can be no doubt now, no matter what the suspension amounted to concerning certain transfers in shares something over a fortnight ago, may have been. The Portland companies' affairs are beyond a doubt in control of the Portland Gas and Coke Company, from any point of view whatever. The new Company is capitalized in $4,000,000, by the American Power and Light Company, the President of which is F. G. Sykes, who has associated with him Mr. W. H. Goode in the management of the Portland General Electric Company. The Chairman of the Board is S. Z. Mitchell, M. H. Arning, Secretary and Treasurer of the new Company, also Secretary of the American Light and Power Company, will remain in Portland for some time to co operate with Herman Papst, General Manager of the Portland Gas Company. He has been retained as General Manager of the new corporation, in the reorganization of local affairs. 'Our policy toward the people will be liberal and our desire to serve them acceptably is sincere,' said Mr. Sykes this morning. 'For a long time we have believed much in the present and future of Portland. In taking over the holdings of the Portland Gas Company, we recognize that much extension work will devolve upon us incident to the city's growth. We are prepared for all extensions and shall make them whenever necessary. Further than this I cannot state just now what our plans will be. We do not know ourselves. The management of the Portland Gas and Coke Company is highly pleased with the working personnel of the Portland Gas Company. In taking over the holdings of this Company there will be absolutely no change in the field or office force. The statement has been made that the amount paid for the holdings of the Portland Gas Company was between $3,000,000 and $4,000,000,' said Mr. Sykes. 'This I will not confirm. The amount, of course, was considerable, but I will not say that it was this amount.' Mr. Sykes will remain in the city but a few days. The American Light and Power Company of which he is President, controls the Astoria street railway, gas and electric plants, as well as the lighting plants in several other cities in various parts of the country, and has in his employ a big force of experts in the lighting business The officers of the Portland Gas and Coke Company are: President, F. G. Sykes; Vice-Presidents, J. G. Wilson, of Portland, and E. W. Hill, of New York; Secretary-Treasurer, M. H. Arning; Assistant Secretary-Treasurer, E. P. Summerson, of New York. M. A. Weathers, of New York, represented the legal interests of the new Company in taking over the Portland Gas Company."

PUBLIC LIGHTING TABLES FOR FEBRUARY, 1910.

These tables are those used for computing the various times during the year, for New York and vicinity, when public lamps of all sorts are to be lighted and extinguished. As will be seen they include the all night and every night practice, and the moontable schedule as well. They were compiled by the American Meter Company, New York city.

Table No. 1.
FOLLOWING THE MOON.

Day of Week.	Date.	Light.	Extinguish.
		P.M.	
Tue.	1	5.50 L.Q.	1.30 A.M.
Wed.	2	5.50	2.30
Thu.	3	5.50	3.30
Fri.	4	5.50	4.40
Sat.	5	5.50	5.40
Sun.	6	6.00	6.00
Mon.	7	6.00	6.00
Tue.	8	6.00	6.00
Wed.	9	6.00 N.M.	6.00
Thu.	10	6.00	6.00
Fri.	11	6.00	6.00
Sat.	12	6.00	6.00
Sun.	13	6.00	5.50
Mon.	14	10.10	5.50
Tue.	15	11.30 F.Q.	5.50
		A.M.	
Wed.	16	12.40 F.Q.	5.50
Thu.	17	1.50	5.50
Fri.	18	2.50	5.50
Sat.	19	3.50	5.50
Sun.	20	4.40	5.50
Mon.	21	5.20	5.50
Tue.	22	No L.	No L.
Wed.	23	No L. F.M.	No L.
Thu.	24	No L.	No L.
Fri.	25	6.20 P.M.	8.20 P.M.
Sat.	26	6.20	9.20
Sun.	27	6.20	10.20
Mon.	28	6.20	11.20

TOTAL HOURS DURING 1910.

	Hrs. Min.
January	229.00
February	188.20
March	184.10
April	161.40
May	152.00
June	136.50
July	146.20
August	165.50
September.	181.30
October	217.10
November.	224.50
December	249.30
Total, year	2237.10

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in 1 Hour.	Complete Extinguishing in 50 Minutes.
		From Time Given.	
		P.M.	A.M.
Tue.	1	4.47	6.07
Wed.	2	4.47	6.07
Thu.	3	4.47	6.07
Fri.	4	4.47	6.07
Sat.	5	4.57	6.02
Sun.	6	4.57	6.02
Mon.	7	4.57	6.02
Tue.	8	4.57	6.02
Wed.	9	4.57	6.02
Thu.	10	4.57	6.02
Fri.	11	4.57	6.02
Sat.	12	5.07	5.57
Sun.	13	5.07	5.57
Mon.	14	5.07	5.57
Tue.	15	5.07	5.57
Wed.	16	5.07	6.52
Thu.	17	5.07	5.52
Fri.	18	5.07	5.52
Sat.	19	5.17	5.47
Sun.	20	5.17	5.47
Mon.	21	5.17	5.47
Tue.	22	5.17	5.47
Wed.	23	5.17	5.42
Thu.	24	5.17	5.42
Fri.	25	5.17	5.42
Sat.	26	5.22	5.32
Sun.	27	5.22	5.32
Mon.	28	5.22	5.32

TOTAL HOURS DURING 1910.

	Hrs. Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September.	311.25
October	370.05
November.	397.40
December	438.35
	3980.25
Deduct on account of 50 minutes extinguishing time....	30.25
Total, year	3950.00

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

MONDAY, FEBRUARY 7, 1910.

The Market for Gas Securities.

Again there is no market for gas securities: that is, no rational one, for the slight recovery of 1 point between the quotations of a week, is not an indication of sense. The voyage on the financial sea was all of the squalmy sort, and even the amateur sailors, who took a chance to leeward, had to smile at the unreasonableness in the quotations that the ticker recorded. It opened to-day (Friday) at 142¼, and by noon it had gone to 144. There was a decided slowness this morning on the part of the trading by some who during the week took the bull by the horns. Technical conditions generally in the Wall street grid-iron are all against any change in value that does not make to shatter them.

Brooklyn Union is 146 to 152; Peoples, of Chicago, is 106¾ to 107, and these shares are returning an earning of 7 per cent. Eastern gas securities are disposed to take on higher values.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

FEBRUARY 7.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	143⅝	144
Central Union Gas Co. —				
1st 5's, due 1972, J. & J.	8,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	2,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101¼
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	146	152
1st Con. 5's, due 1948, M. & N.	15,000,000	—	95	99
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	5/8	11-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,600,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,036,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	881,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	106	106½
Preferred	2,500,000	100	—	98
Bonds	10,000,000	1,000	104	—
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108½
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	77⅛	77¾
Preferred	25,000,000	100	95½	96
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106¾	107
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	360	380
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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(Continued on page 258.)

SPECIAL MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, December 9, 1909.

A Special Meeting of the Stockholders of The United Gas Improvement Company will be held at the office of the Company, Northwest Corner of BROAD AND ARCH STREETS, PHILADELPHIA, on Wednesday, Feb. 9, 1910, at 12 o'clock, noon, for the purpose of acting upon the subject of a proposed increase in the authorized capital stock of the Company from 1,009,467 shares, of the par value of $50 each, to 1,110,414 shares, of the par value of $50 each.

By order of the Board of Directors.

W. F. DOUTHIRT, Secretary.

The stock transfer books will be closed from 3 P.M., Jan. 28, 1910, until 10 A.M., Feb. 10, 1910.

1801-9

ANNA VIRGINIA MILLER,

Lecturer and Demonstrator of Cookery by Gas or Electricity,

1237 Harrison Street, Kansas City, Mo.

1805-3m

WHO

Is in Need of the Services of a Superintendent of Distribution?

Fifteen years in distribution department, 2 years in manufacturing department. Water gas machinist and draftsman. Age 45. Married.

1803-3 Address, "ACTION," care this Journal.

MANAGER,

Desires to make a change. Experience of 15 years in all branches.

Address, "CAPABLE,"

1809-1 Care this Journal.

Wanted, Position

As Superintendent of Works

In medium-sized plant. Coal gas works preferred. Eighteen years' experience in construction and operation of plants. Address, "SUPT.,"

1809-1 Care this Journal.

Position Wanted.

Meter Repairer and Tester,

In charge of a place at present, wishes to make a change. Can do anything with a meter, either of the regular or prepayment type. Best of references.

Address, "T. W.,"

1809-1 Care this Journal.

WANTED, BY MARCH 30,

Head Stoker for Coal Gas Plant in Small Town,

Capable of doing anything around works. State experience. Address, "PLANT,"

1807-tf Care this Journal.

FOR SALE,

One set of 4 purifying boxes 12 feet 8 inches by 10 feet 9 inches by 3 feet, in good condition, with centerseal and 10-inch connections.

1771-tf YORK GAS CO., York, Pa.

Alcohol, its Manufacture from Farm Products and De-Naturing. By F. B. WRIGHT.

Price, $1. *For Sale by*

A. M. Callender & Co., 42 Pine St., New York City.

STANDARD REDUCTION FACTORS for GASES,

By Helon Brooks MacFarland, B.S., M.M.E.

Price, $1.50. *For Sale by*

A. M. Callender & Co., 42 Pine St., New York City.

Modern Machine Shop Construction, Equipment and Management, by OSCAR E. PERRIGO, M.E.

Price, $5. For Sale by

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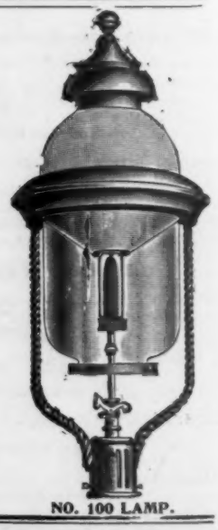

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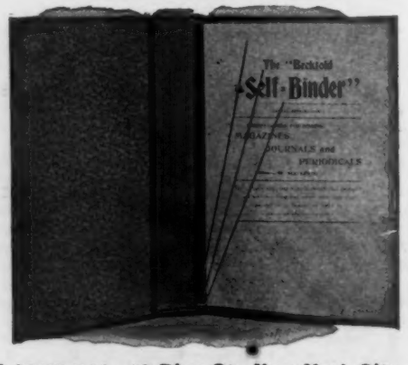

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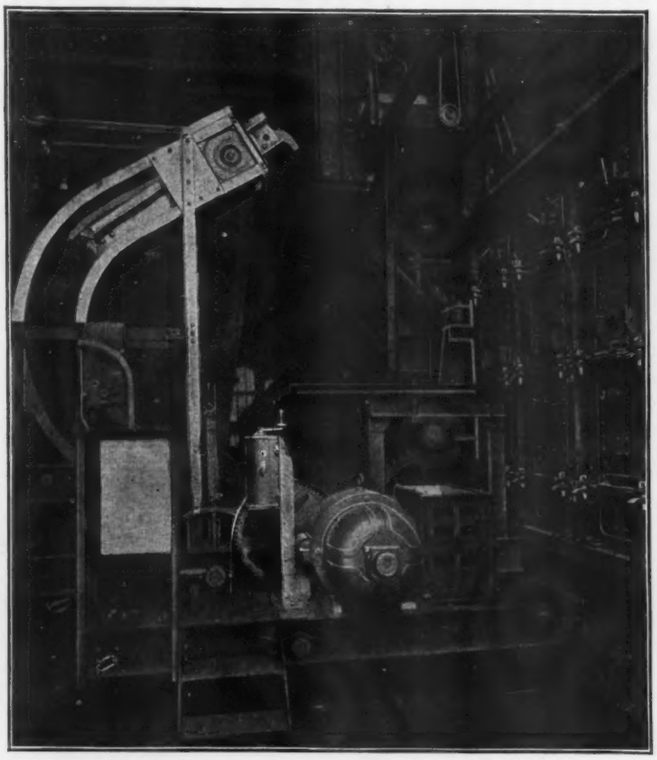

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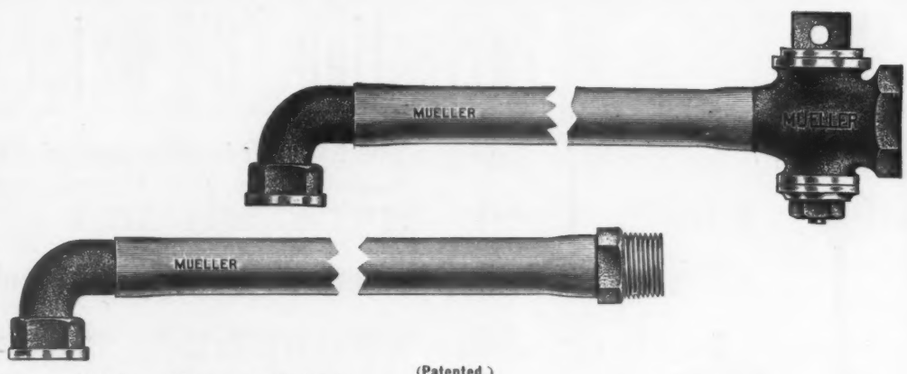

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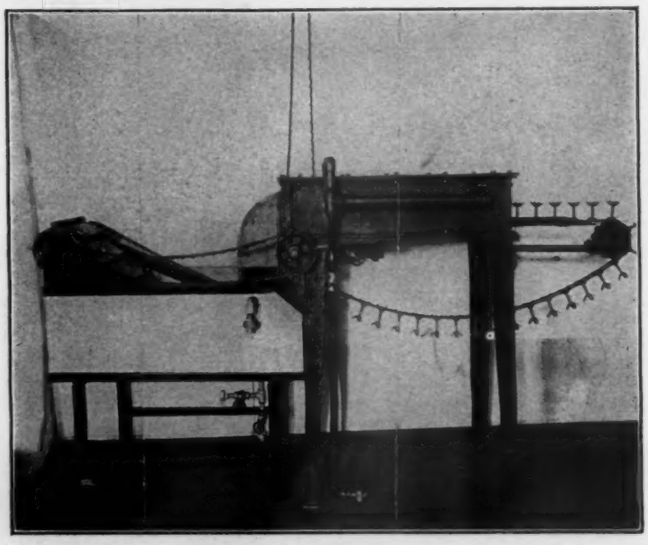

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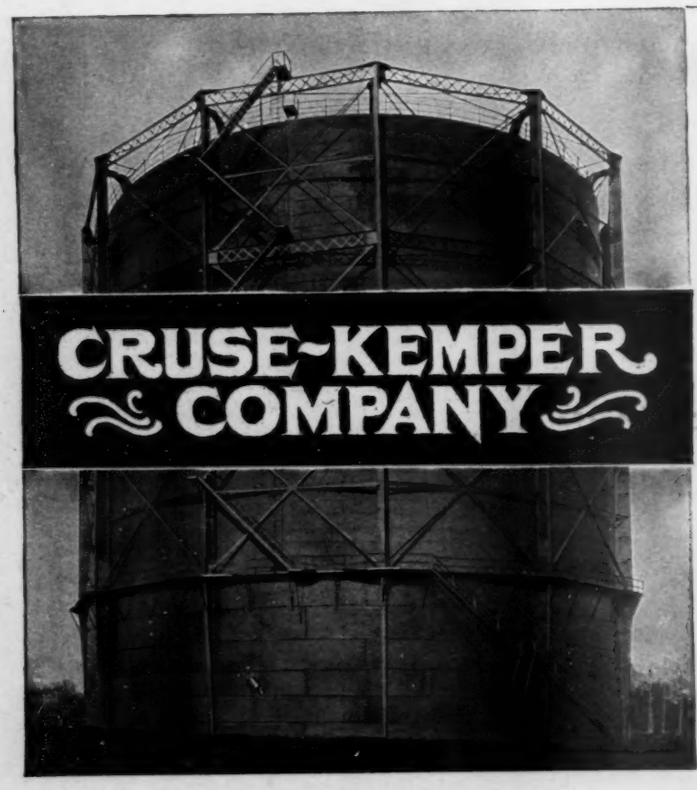

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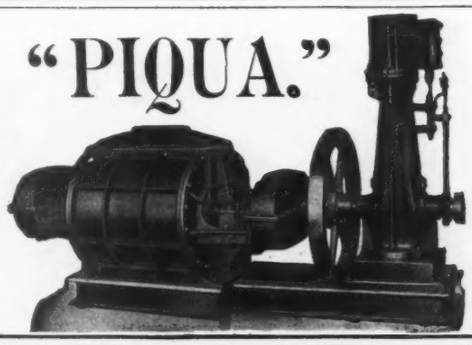

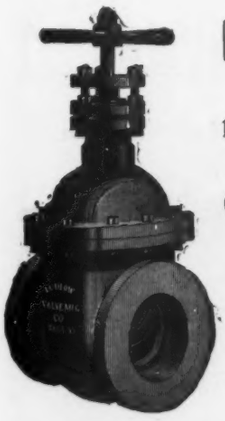

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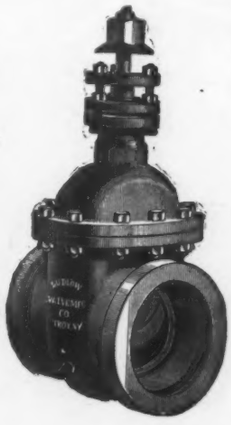

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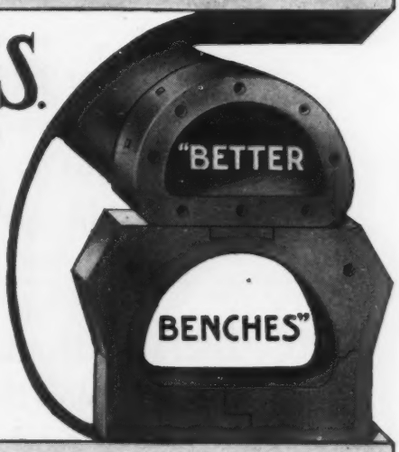

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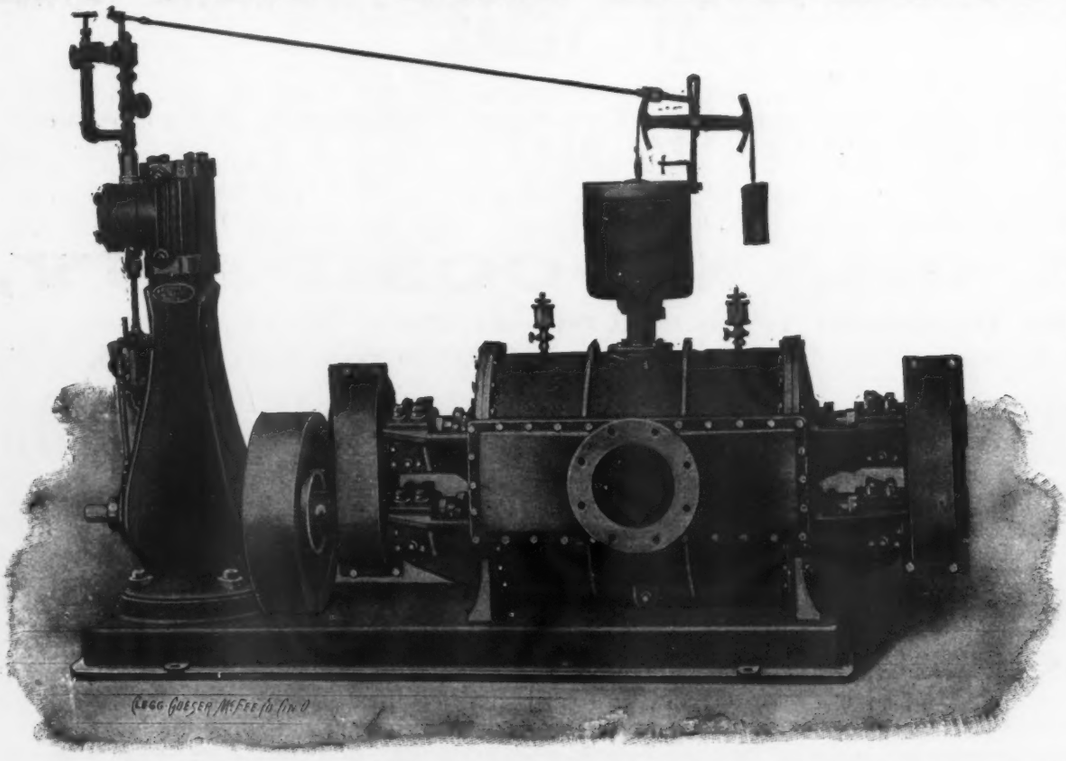

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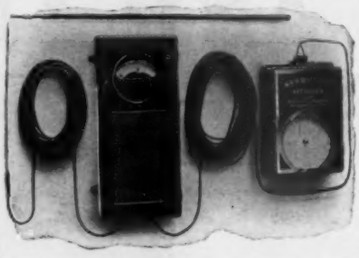

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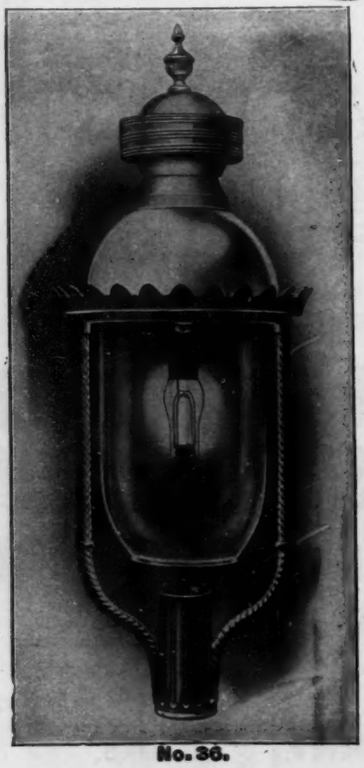

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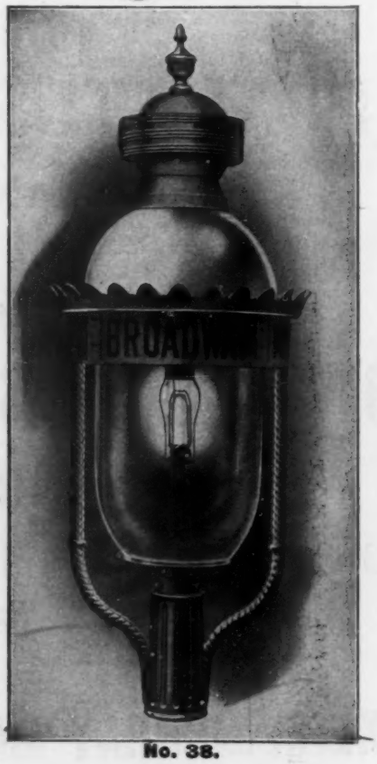

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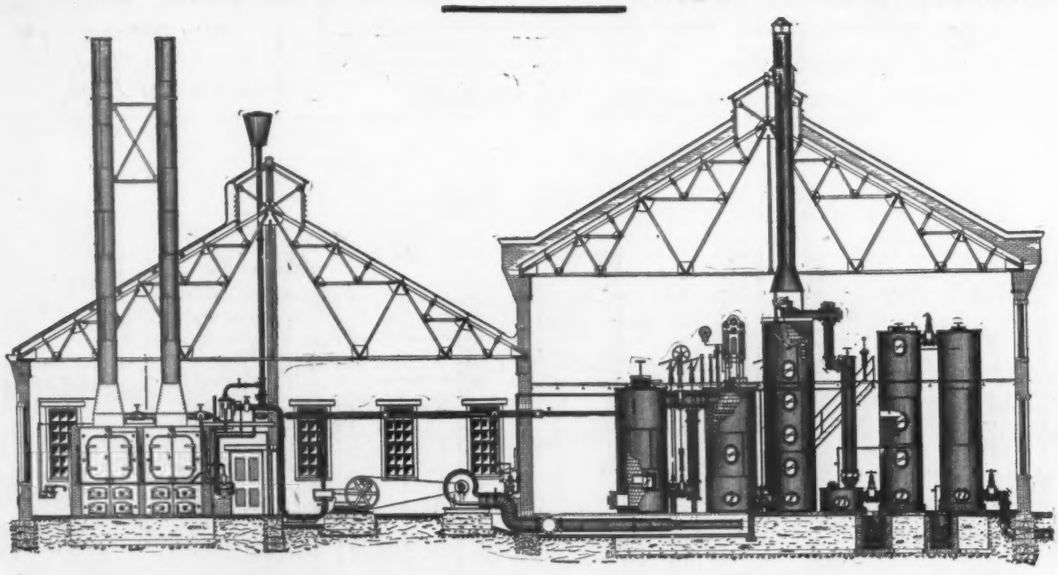

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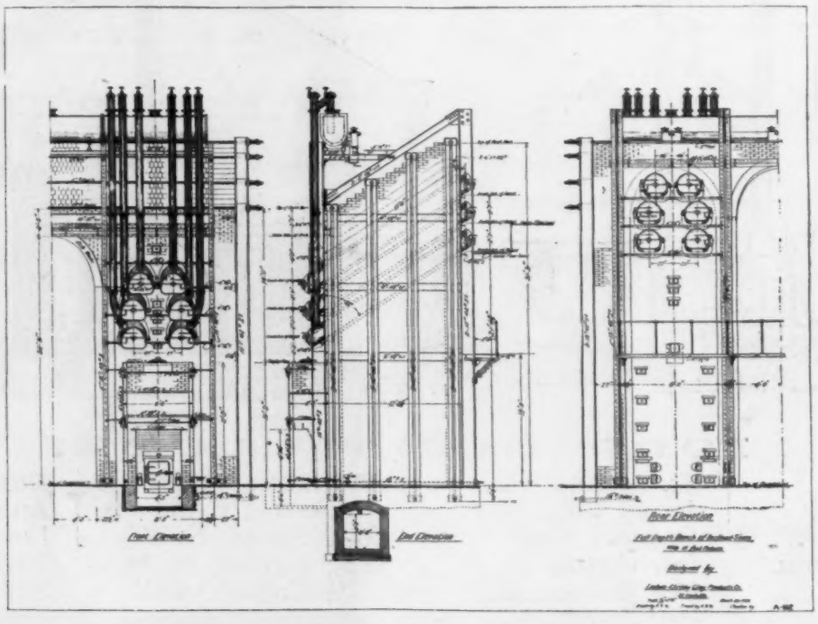

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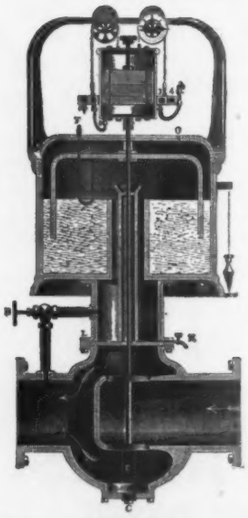

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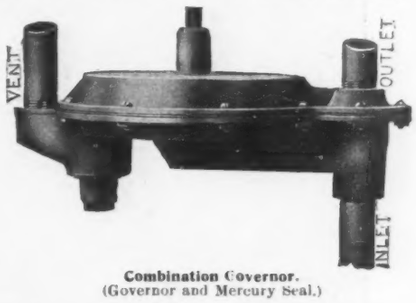

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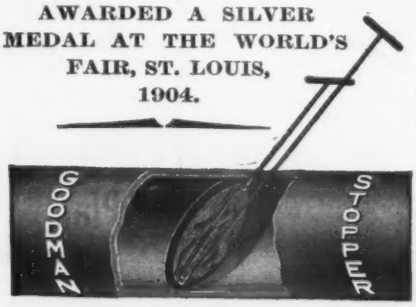

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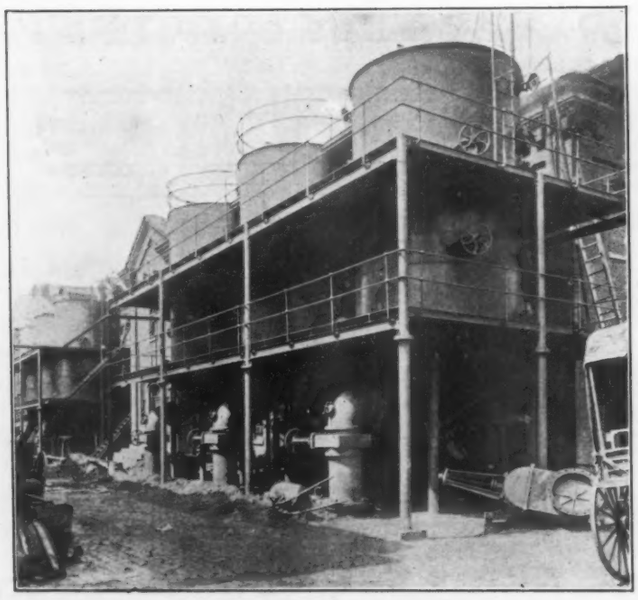

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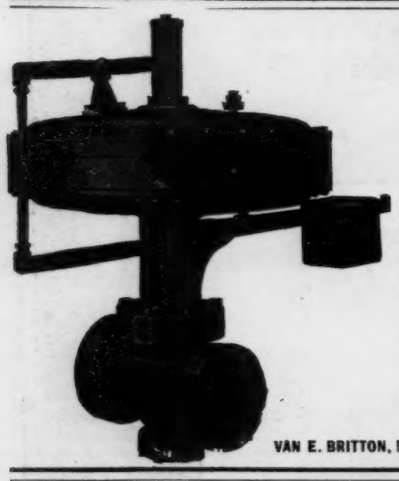

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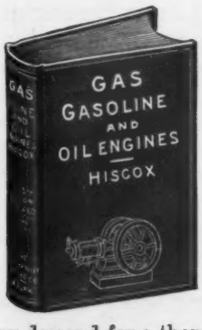

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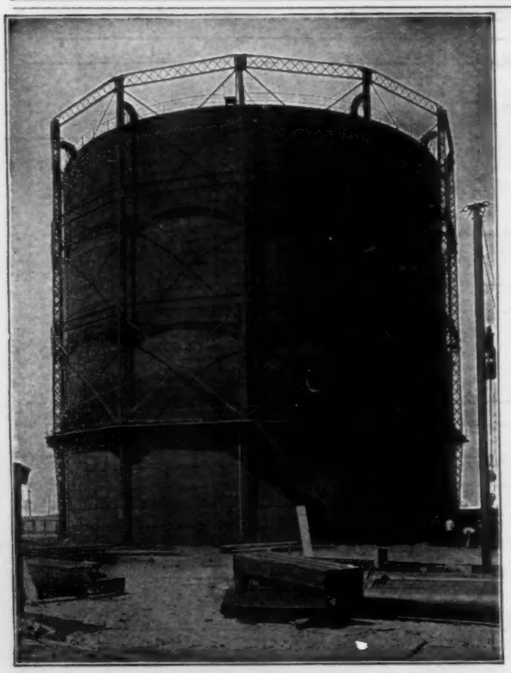

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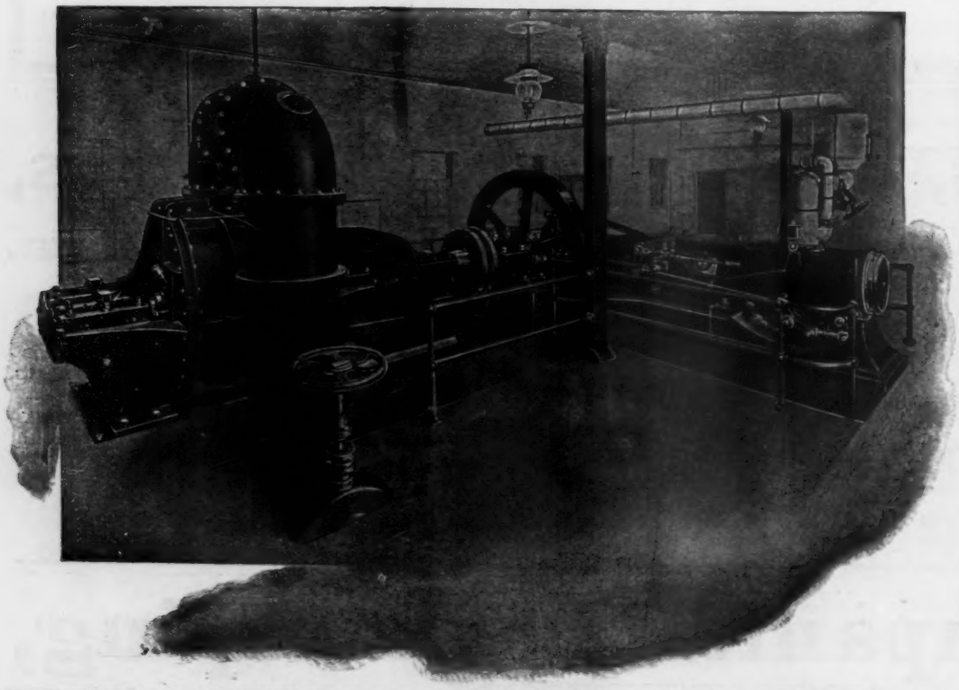

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